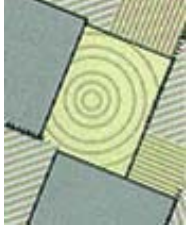
THE BRITISH SURVEY OF

Fertiliser Practice

FERTILISER USE ON FARM CROPS
FOR CROP YEAR 2013



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The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

Designation can be broadly interpreted to mean that the statistics:

- meet identified user needs;
- are well explained and readily accessible;
- are produced according to sound methods; and
- are managed impartially and objectively in the public interest.

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

Further statistical analyses of the survey results are also available. For details and costs please contact:

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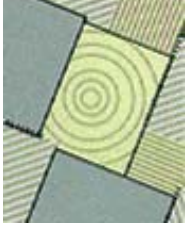
https://www.gov.uk/government/collections/fertiliser-usage



FOREWORD

The British Survey of Fertiliser Practice provides information on fertiliser use on the major crops and grass grown in mainland Britain.

The 2013 Survey was funded by the Department for Environment, Food and Rural Affairs (Defra) and the Scottish Government. The Survey has the full support of the Farmers' Unions in England, Scotland and Wales.

The Survey is carried out annually and is based upon returns from a sample of farms. In 2013, the Survey was co-ordinated by GfK Kynetec, who was responsible for the survey design, data collection, statistical analysis and quality control monitoring.

Data uses and comparison to the EU

The information in this publication is widely used by the UK government and the EU, industry and researchers and collects data on trends in usage and application rates of nitrogen, phosphate, potash, sulphur, organic manures and lime on agricultural crops and grassland in Great Britain.

The Survey data provide important evidence to assess greenhouse gas emissions from agriculture, informing the ammonia and greenhouse gas inventories and for the development of possible mitigation measures. Additionally the data provide information on fertiliser use in NVZs (nitrate vulnerable zones) and for developing and assessing the impact of policy on water quality, particularly the Nitrates Directive (Council Directive 91/676/EEC). The data have also been used for indicators on nutrient balances, other indicators relating to environmental impacts and other cross cutting work looking at links between fertiliser use and productivity (benchmarking) and economic performance. Industry and government use the data to monitor best practice.

Information on all of these topics are available from the Gov.UK website and includes information on, greenhouse gas emissions, climate change and NVZs which are of particular relevance.

The data are also used to meet certain legislative obligations at a national and EU level. Information on the use of fertilisers across the EU is available from the Eurostat website. It includes a summary report with a comparison of the usage and links to detailed data for the individual countries.

Other information

Defra also run other surveys which may be of relevance to fertiliser use and related practices through its Farm Practices Survey for England, which is available on the Defra website.

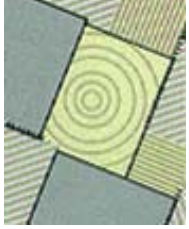
Contact information and feedback

Contact details are available at the front of this publication for feedback or for questions about the information provided.

Data revisions

See section A2.6 for details of revisions made in 2014. There are no data revisions to report for 2013.

April 2014



ACKNOWLEDGEMENTS

The sponsors gratefully acknowledge the co-operation of all farmers taking part in the 2013 British Survey of Fertiliser Practice.

We wish to thank all those involved for their assistance and support in the design, conduct and analysis of the Survey.

The agronomic interpretation of the Survey results benefited from advice from Chris Dawson (Chris Dawson and Associates), agronomic consultant to the Agricultural Industries Confederation (AIC).

Kate Benford[1]

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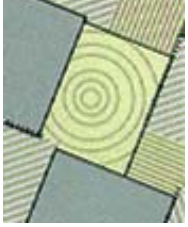

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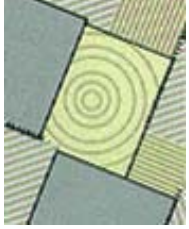

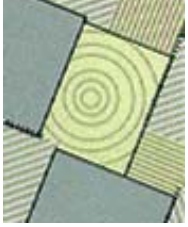

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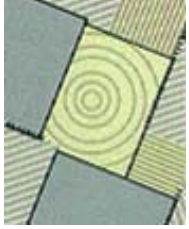
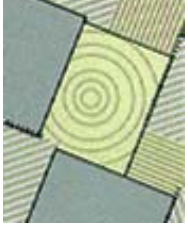
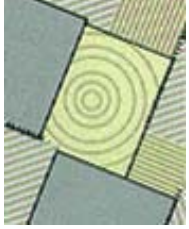






EXECUTIVE SUMMARY

The British Survey of Fertiliser Practice is an annual, nationally representative interview survey based on the selection of a random stratified sample of farms from mainland Britain. The main purpose of the survey is to estimate average application rates of nitrogen, phosphate and potash used for agricultural crops and grassland. The data provide important evidence to assess greenhouse gas emissions from agriculture and for developing possible mitigation measures. Information is also collected on applications of sulphur fertilisers, organic manures and lime.

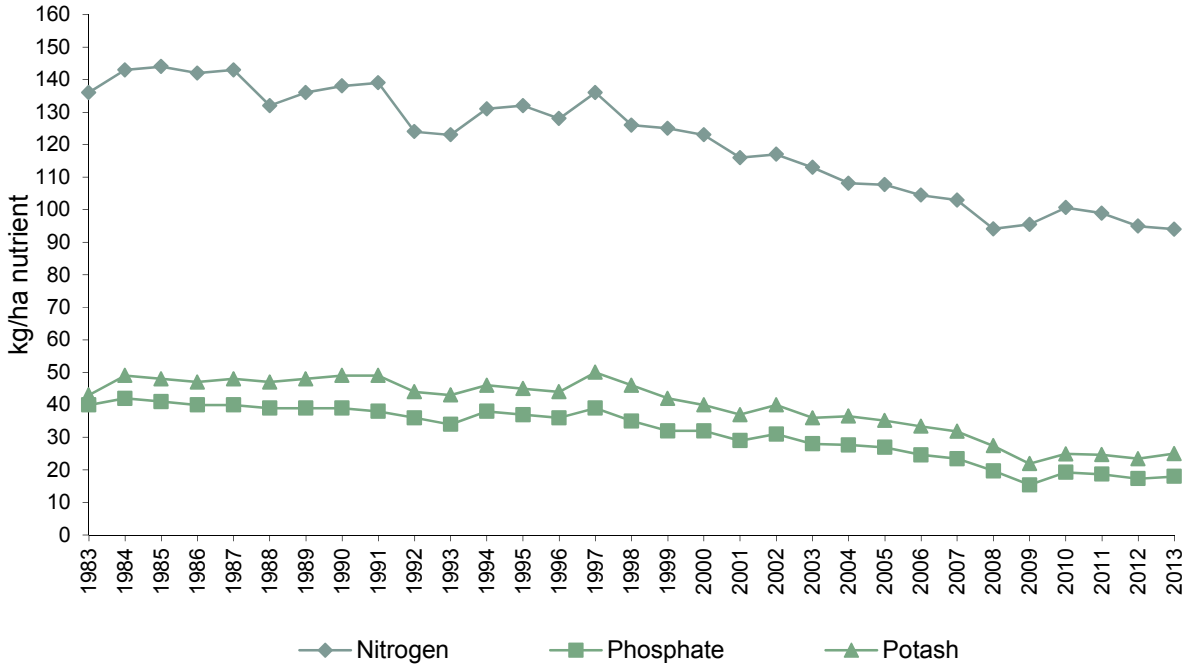
The main findings from the 2013 Survey on the use of the nutrients nitrogen, phosphorus, potassium and sulphur in Great Britain are summarised below (Table ES1).

The weather was a major influence on fertiliser use in the 2013 crop year. A very wet 2012 autumn made drilling difficult and impacted on survival of crops through the winter and a swing to spring grown crops, which often require less fertiliser. There was an overall 1.8% decrease in the total area of tillage crops planted and the area of spring barley and oilseed rape increased significantly. The weather is discussed more fully in Section A3.1 with a more detailed overview of the data in Section B and crop level information summarised in tables GB1.1-1.3 of Section C.

Table ES1 Nutrient dressing cover, current and five year mean overall application rates for all crops and grass, Great Britain 2013

	All Tillage	All Grass	All Crops and Grass
Total Nitrogen - N			
Overall application rate, 2013 (kg/ha)	136	59	94
Mean overall application rate, 2009-2013 (kg/ha)	142	58	97
Crop area receiving dressing, 2013 (%)	92	62	75
Average field rate, 2013 (kg/ha)	148	96	125
Total Phosphate - P_2O_5			
Overall application rate, 2013 (kg/ha)	28	9	18
Mean overall application rate, 2009-2013 (kg/ha)	27	9	18
Crop area receiving dressing, 2013 (%)	48	42	45
Average field rate, 2013 (kg/ha)	59	22	40
Total Potash - K_2O			
Overall application rate, 2013 (kg/ha)	40	13	25
Mean overall application rate, 2009-2013 (kg/ha)	37	13	24
Crop area receiving dressing, 2013 (%)	51	43	47
Average field rate, 2013 (kg/ha)	78	29	53
Total Sulphur - SO_3			
Overall application rate, 2013 (kg/ha)	27	2	13
Mean overall application rate, 2009-2013 (kg/ha)	25	2	12
Crop area receiving dressing, 2013 (%)	47	8	25
Average field rate, 2013 (kg/ha)	58	33	54

Figure ES1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 1983 - 2013

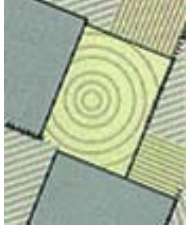


Nitrogen

- Nitrogen usually has a large immediate effect on crop growth, yield and quality. Most agricultural soils contain too little naturally occurring plant-available nitrogen to meet the needs of a crop so supplementary nitrogen applications have to be made each year.
- The 1 kg/ha decrease in total nitrogen use on all crops and grassland in 2013 resulted from a large 8 kg/ha decrease in the overall rates on tillage crops to just 136 kg/ha, lower than the typical 145-150 kg/ha range which has been observed for the majority of the 25 years of the survey. It is likely that the adverse weather which impacted cropping including the swing to spring cropping was a major factor in this. Partially failed crops and generally poorer tillage crops are likely to have contributed to this reduction in nitrogen use also. The previous lows for 2008 and 2009 were attributed mainly to the high fertiliser prices.
- Nitrogen levels applied to grassland have been consistently lower than tillage crops. Since 2000, the overall applications made to grass have fallen consistently relative to those made to tillage crops. The recent decline in cattle numbers is thought to have contributed to this reduction in the nitrogen rate on grassland, possibly in conjunction with some improvement in manure use efficiency.
- Overall application rates of nitrogen on winter cereals were similar to those reported in 2012. The overall nitrogen rate on spring barley increased by 9 kg/ha to 108 kg/ha, the highest recorded rate since 2002. Total nitrogen on oilseed rape reduced by 9 kg/ha in 2013, and this reduction is mainly attributable to an increase in spring sown oilseed rape.

Phosphate and potash

- Phosphate and potash are applied in fertilisers and manures, particularly to replace the quantities removed in harvested crops. Most British soils can hold large quantities of these nutrients for crop uptake over several years. Consequently the timing of maintenance application tends to be less time critical compared to nitrogen or sulphur. This may help to explain the trend seen for overall declining dressing cover on combinable crops, especially in England.
- The overall application rates in 2009 for both phosphate and potash were the lowest recorded since this dataset began in 1983. Overall rates of phosphate and potash applied to tillage crops are more than three



times those used on grassland. However there is greater use of applied manures on grassland (37% cover) than on tillage crops (23% cover) and grazed grassland also receives manure as it is grazed.

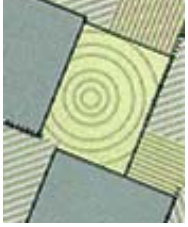
- Overall phosphate use on tillage crops declined gradually between 1984 and 1996. Thereafter the decline in rates became more marked declining to an overall rate of 28 kg/ha in 2013. This is the second lowest rate since Great Britain records began. The overall rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and remained relatively stable between 1984 and 1998. Overall application rates have declined more rapidly in the period since 1999, and in 2013 declined to the lowest rate at just 9 kg/ha.
- Overall potash application rates on tillage crops declined slightly between 1983 and 1997, with the rates in the 60-68 kg/ha range. Like phosphate, overall application rates reduced at a greater rate after this time, dropping to their lowest levels of 33 kg/ha in 2009 when fertiliser prices were high. Between 2010 and 2013 overall potash application rates have been in the range 37-40 kg/ha.
- Whilst the pattern of use of potash on grassland has been more variable, this has also shown a net decline between 1983 and 2013. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1990s but, since then, have tended to decline and have been in the range 12-14 kg/ha since 2008.
- It is of note that in Scotland the phosphate and potash application rates on tillage land have largely been maintained, relative to the decline seen in England.

Sulphur

- Sulphur is an essential plant nutrient and is a component of most proteins as well as activating certain enzyme systems. In the past sulphur demand was satisfied through atmospheric deposition but this has declined significantly. Therefore there is a need for sulphur application to crops and grass; with crops such as oilseed rape are particularly sensitive to sulphur deficiency. Sulphur can also be used as a soil acidifier for potatoes which can offer some protection against scab.
- The Survey has collected detailed information on sulphur (SO_3) fertiliser use since 1993, when only 3-6% of the cereal crop areas and 8% of the oilseed rape area received a sulphur application. By 1997, these proportions had increased markedly to 13-14% for cereals and 30% for oilseed rape. Dressing covers for sulphur generally remained fairly static until 2002, and then increased steadily to 2007. Dressing covers reduced in 2008 and 2009 for all cereals except winter barley. In 2013 cereals sulphur dressing covers were in the 43%-53% range. The 73% dressing cover for winter oilseed rape was the same as in 2012.
- In 2013, 25% of all crops and grass received a dressing of sulphur, this figure was 47% for tillage crops. On tillage crops the overall application rate for sulphur was 27 kg/ha, a decrease of 2 kg in comparison to last year. Applications on grass were consistent with 2012 at 2 kg/ha, this low overall rate is caused by the low dressing cover, with only 8% of grass receiving a sulphur dressing.

Organic manures

- Historically, the Survey has focussed on the application of manufactured fertilisers although in recent years it has also collected information on the use and movement of organic manures. The nutrient levels in organic manures vary according to the type of manure but provide a valuable source of nitrogen, phosphorus and potassium. Where used, applications of manufactured fertiliser can usually be reduced.
- In 2013, around 68% of farms in the survey used organic manures on at least one field on the farm. Cattle manure from beef and dairy farms is by far the largest volume of manure type generated in Great Britain. The majority of cattle manure and slurry applications were made to grassland, reflecting the practice of utilising the manure on the farm on which it is produced.
- Fields for winter sown crop are primarily treated in August and September, prior to drilling, whereas spring sown and grass fields are predominantly treated between November and April.



SECTION A

THE BRITISH SURVEY OF FERTILISER PRACTICE

A1 INTRODUCTION AND STRUCTURE OF THE REPORT

The British Survey of Fertiliser Practice (BSFP) is the primary source of data on organic and inorganic fertiliser use in Great Britain. The results from the Survey are used by the British fertiliser industry, by Government and by the wider agricultural community. It is essential that the claims made from the Survey are underpinned by an effective methodology. Section A2 describes this methodology, detailing measures undertaken to avoid bias and unreliability. National changes in relative cropping areas are discussed in Section A3.

Section B provides a commentary of recent changes in survey data and longer term trends. It includes estimates of total fertiliser which are given in Table B2.6. These data are derived from BSFP findings, confidential trade and sales data and HMRC import/export statistics. Section C presents the main tables of results from the Survey, grouped by geographic coverage. They include major crop groups, grassland, product types and farm types plus information on timing of applications. Figures for estimates of 'total', 'straight' and 'compound' nutrient rates are presented in separate tables. Section D provides an analysis of the application of organic manures and manufactured fertilisers. Section E contains more general information on farm practices such as spreader checking and record keeping. Datasets for key data series are available via the Defra website.

A1.1 HISTORY

The survey has been in existence, in various forms, since 1942 for England & Wales. It was extended to Scotland in 1983. Historical data from 1942 to 1997 have been summarised in several reviews spanning this period of time.[2, 3, 4, 5]

The current methods of survey design and implementation are the result of adaptation of the original design from Rothamsted Experimental Station, undertaken by Edinburgh Data Library at the University of Edinburgh between 1992 and 1998. From 1999 until 2003 design and analysis was undertaken by the Rural Business Unit at the University of Cambridge and from 2004 by GfK Kynetec (formerly Kynetec Limited), who also retained responsibility for conducting the fieldwork.

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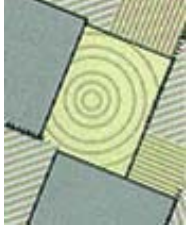
[2] Yates, F. and Boyd, D.A. (1965). Two decades of Surveys of Fertiliser Practice. *Outlook on Agriculture* **5**, 203-210.

[3] Church, B.M. and Lewis, D.A. (1977). Fertiliser use on farm crops, England and Wales: Information from the Survey of Fertiliser Practice, 1942-1976. *Outlook on Agriculture* **9**, 186-193.

[4] Chalmers, A.G., Kershaw, C.D. and Leech, P.K. (1990). Fertiliser use on farm crops in Great Britain: Results from the Survey of Fertiliser Practice, 1969-1988. *Outlook on Agriculture* **19**, 269-278.

[5] Chalmers, A.G., Renwick, A.W., Johnston, A.E. and Dawson, C.J. (1999). Design, development and use of a national survey of fertiliser applications. *Proceedings International Fertiliser Society* **437**.



A2 SURVEY METHODOLOGY

A2.1 SAMPLE

This survey is based on a sample of holdings in order to reduce burdens and manage resources. The Survey sample is selected from the population of agricultural holdings compiled using the June Agricultural Survey (a sample survey conducted annually which records information on farm size, cropping, stocking and employment). In each year, two samples are extracted from the June Survey, one for England & Wales and one for Scotland. Holdings less than 20 hectares in size are excluded from the BSFP sample. These smaller farms account for a significant proportion of the number of holdings but a much smaller proportion of the area of crops and grass. At Great Britain level, holdings below this size account for 4% of the total crop area and 10% of the total grass area. Further information is provided in Appendix 1.3. Using this threshold reduces the number of farms which need to be sampled so reducing burdens and costs without significant adverse impact on the quality of the data. The data for the medium and large farms will be representative of the very small farms which are excluded, meaning that the overall figures are representative of all farms. Standard errors are reported in Appendix 1.1.

In England & Wales, farms are classified into one of three types, cropping, livestock and horticulture. Farms are then further classified into four size groups. In Scotland, a similar number of size groups are used but farms are classified into only two types, mainly cropping and mainly livestock.

These higher level farm types are based on groupings of the standard UK (and EU) farm classifications (called 'robust' types). Farms with a robust type of 'Other' (robust type 10) are not included in the sample. See A2.3 paragraph 9 for more details.

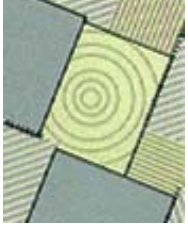
The target sample size is 1500 farms. This sample size has been designed in order to achieve a statistically representative sample at the national level. The farms are allocated to each of the combinations of farm type and size in proportion to the total area of crops and grass recorded in the June Survey (the latest available data). The exception to this is that in England & Wales the number of farms in the horticultural group are sampled at a higher rate to ensure sufficient numbers for a robust estimate to be made. See Tables A2.1 and A2.2 for the number of farms selected.

Three reserves are selected for each farm in the main sample. The reserves will be the nearest holding (using the County/Parish/Holding (CPH) number) and of the same farm type and size. The survey is voluntary. Each farm in the main sample is contacted; if for whatever reason a farm is not able to take part in the survey, the first reserve for that farm is then contacted. If this farm also refuses then the second and if necessary the third reserve is contacted. If all four farms refuse then no farm is recruited into the survey.

This resulted in an achieved sample size of 1,360 holdings in 2013, which is 2% lower than that achieved in recent years. It was thought that the difficult farming conditions of 2013 impacted respondents' willingness to participate. More information on response rates is given in Appendix 1, in Tables App 1.2 and App 1.3. It should be noted that the underlying sample design is constructed to measure manufactured fertiliser usage and may not wholly represent the population of farmers using organic manures so some of these data, especially where sample sizes are small, need to be treated with appropriate caution.

To help improve the survey response and to reduce the year-on-year variability, a core of respondents complete the survey each year. This was introduced in 2000 when approximately one third of the sample agreed to stay in the survey for a number of years. Between 2006 and 2007 a review of the panel structure was undertaken to ensure that the proportion of respondents who had participated on the panel for five consecutive years or more constituted no more than 20% of the total sample. In 2013, 76% of the sample had responded in the previous year. The profile of the panel in terms of farm size was 76% >200ha, 77% 100-200ha, 76% 50-100 ha and 77% >20-50 ha.

The sample responses are raised to be representative of the national population by using the inverse of the achieved sampling fraction (i.e. the number of holdings in the population divided by the achieved sample size in each strata) as the weight. The validity of the derived weights are assessed by calculating a weighted crop area for the most extensively grown crops by this method and comparing this to the latest



available crop area estimates from the June Survey. Standard errors are calculated for key results (major crops) using standard survey statistical methodolology (Appendix 1).

Table A2.1 Derivation of the stratified random sample for the 2013 survey, England & Wales

	farm holdings in population in 2012	total crops and grass in 2012 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
England & Wales						
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & lowland), mixed)						
crops & grass area						
20-50 ha	18,357	7.2	0.48	88	87	0.47
51-100 ha	16,297	13.7	1.03	168	158	0.97
101-200 ha	11,105	17.8	1.98	220	180	1.62
200+ ha	4,536	17.8	4.85	220	144	3.17
Total livestock & mixed	50,295	56.5	1.39	697	569	1.13
Crops						
(Robust types: cereals, general cropping)						
crops & grass area						
20-50 ha	6,910	2.7	0.48	33	45	0.65
51-100 ha	6,119	5.2	1.04	64	75	1.23
101-200 ha	5,923	9.9	2.06	122	133	2.25
200+ ha	5,340	24.3	5.61	300	269	5.04
Total crops	24,292	42.0	2.13	518	522	2.15
Horticulture						
(Robust type: horticulture)						
crops & grass area						
20-50 ha	697	0.3	0.88	6	9	1.29
51-100 ha	371	0.3	1.97	7	5	1.35
101-200 ha	205	0.3	3.92	8	5	2.44
200+ ha	112	0.6	12.05	13	7	6.25
Total horticulture	1,385	1.4	2.53	35	26	1.88
Total for England & Wales	75,972	100		1,250	1,117	1.47

[a] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2012*

[b] The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2012*

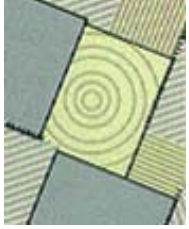


Table A2.2 Derivation of the stratified random sample for the 2013 survey, Scotland

	farm holdings in population in 2012	total crops and grass in 2012 (column %)	notional sampling fraction[a] (%)	target sample size	achieved sample size	achieved sample fraction[b] (%)
Scotland						
Cereal/general						
(Robust types: cereals, general cropping, horticulture)						
crops & grass area						
20-50 ha	1,231	2.6	0.52	6	8	0.65
51-100 ha	1,435	6.4	1.11	16	15	1.05
101-200 ha	1,384	12.0	2.17	30	29	2.10
200+ ha	746	15.5	5.21	39	33	4.42
Total cereal/general	4,796	36.5	1.90	91	85	1.77
Livestock & mixed						
(Robust types: specialist pigs, specialist poultry, dairy, cattle and sheep (LFA & lowland), mixed)						
crops & grass area						
20-50 ha	2,875	5.9	0.51	15	16	0.56
51-100 ha	3,030	13.5	1.11	34	33	1.09
101-200 ha	2,528	21.4	2.12	54	53	2.10
200+ ha	1,152	22.7	4.93	57	58	5.03
Total livestock & mixed	9,585	63.5	1.66	159	160	1.67
Total for Scotland	14,381	100		250	245	1.70

A2.2 DATA COLLECTION

Data collection was undertaken between June and September 2013 mainly through face to face interview with individual farmers. In addition to collecting information on the fertiliser use on each field, the recorder collected general information on the holding and the use of lime and organic manures and slurries.

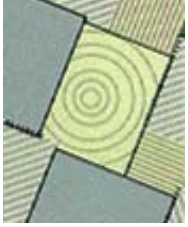
Official quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1965 are shown in Table B2.6. These data are based on BSFP findings and confidential trade and sales data which are contributed by AIC industry members who represent over 90% of the market. They are compiled by the Agricultural Industries Confederation in conjunction with Defra. Further information is provided in Section A2.5.

A2.3 DATA QUALITY ASSURANCE

Experienced and knowledgeable field staff are used to collect the required information. They make use of information from a variety of different records kept by farmers. Farm diaries are the most common method used on farm. Further information is provided in Section D/E. At data entry, any omitted responses, figures outside pre-agreed limits or other discrepancies are flagged for checking and followed up, often by contacting the survey respondent. Total crop areas reported under this survey are checked against information held in the June Survey. Additionally 10% of interviews undertaken will be subject to a call back by an independent reviewer to check responses to individual questions as part of data quality assurance arrangements. The aggregated figures are checked for consistency and trend analyisis against historic data and are subject to independent expert peer review.

[a] The *notional sampling fraction* is found by expressing the *target sample size* as a percentage of the *farm holdings in population in 2012*

[b] The *achieved sampling fraction* is found by expressing the *achieved sample size* as a percentage of the *farm holdings in population in 2012*



A2.4 ACCURACY AND RELIABILITY OF THE INFORMATION

The use of sampling in this survey means that there will be certain limitations associated with the data associated with this. The sampling methodology used is described more fully in Section A2.1 but essentially uses a random stratified sampling strategy approach, with an element of a core panel, to obtain a representative sample. A response rate of 51% was achieved in 2013, which was a 2% reduction from 2012. Sampling errors arise because even with careful selection, the sample cannot be exactly representative of all the population. The size of the sampling error will depend on the size of the sample (the larger the sample the smaller the error) but also on the variance of the data. An indication of the extent to which the sample result deviates from the population can be obtained from measuring the standard error associated with the data.

A fuller description of this standard statistical measure with the sampling variation/standard errors for the main arable crops, all tillage crops and all grass are reported in Appendix 1, Table App1.1. These can be used to help judge whether apparent changes may be real or attributable to sampling variation alone. The standard errors are relatively small for all tillage crops, all crops and the main arable crops of wheat, oilseed rape and barley. The standard errors are higher for sugar beet and potatoes where sample sizes (crop area, number of respondents) are smaller.

Figures reported for some of the smaller crops, where the sample size is relatively low, need to be treated with appropriate caution. Sample size information is provided in the tables in Section C and help to provide an indication of reliability. For crops where the sample size is relatively small it is advisable to use data from several years and to assess trends over a longer time period rather than just considering year on year changes.

For potatoes in particular, part of the reason for apparent fluctuations in estimates of nutrient application rates may be because fewer numbers of fields of potatoes are covered by the Survey than would be expected from a sample survey. This is due to the fact that fields of potatoes on respondent's farms may be let out and grown by a third party so it is not possible to record information in the Survey. Furthermore, fields of potatoes grown by a respondent but not on his own farm are not captured in the Survey.

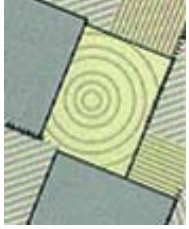
The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England and Wales due to its greater area of total crops and grassland: about 9.2 million hectares in England and Wales and about 1.9 million hectares in Scotland. The estimates of the average field rates provide a better indication than overall application rates of actual usage levels and also of any annual variation in fertiliser practice on farms. The overall application rate takes into account both the average field rate and the proportion of the crop area treated, giving an overview of the crop as a whole. The definitions of the terms used are set out in Section A2.7 of this report.

Additionally, the survey design has been constructed to measure use of manufactured fertilisers so may not be wholly representative of manure use so some of these data, especially where sample sizes are small, need to be treated with caution.

A2.5 METHODOLOGY FOR TOTAL FERTILISER USE

Official quantities of nitrogen, phosphate and potash fertiliser consumed annually in the UK since 1965 are shown in Table B2.6. These data are based on BSFP findings, HMRC import data and confidential trade and sales data which are contributed by AIC industry members who represent over 90% of the market. They are compiled by the Agricultural Industries Confederation with input and peer review by an expert group convened by the AIC and in liaison with Defra.

It would be possible to use BSFP data alone to estimate total fertiliser use by taking the average rate for each individual crop and multiplying by the June crop area estimate and summing these to give an overall usage. However the relatively low coverage of the BSFP survey for some crops, means that the alternative approach of combining BSFP data with trade and sales data provides more robust total usage estimates than using BSFP data alone. This method also takes into account use on small farms (<20 ha) and use in Northern Ireland.



The AIC survey their members (16 businesses) monthly to collect information on fertiliser deliveries. The BSFP fertiliser statistics published and used in the industry and agricultural sector are by fertiliser year (growing season, July to June), not by calendar year. They are available at the AIC website.

Individual returns are quality assured by trend analysis against historic data and also against the aggregate trend. Any omitted data or anomalous figures outside trend or other pre-defined limits are checked and followed up, usually by contacting the survey respondent.

The AIC also purchase monthly HMRC trade statistics on imports and exports of fertilisers; these data are actively used and scrutinised, and where appropriate challenged by the trade. Twice a year, in December and June, and on an annual basis, aggregated figures for total fertiliser deliveries for the main types of fertiliser are calculated, together with nutrient contents. These are assessed with the import and export figures to derive the base total fertiliser usage figures. The N:P:K ratio from the BSFP survey is compared with the AIC derived figures to confirm the nutrient quantities relative to each other. Further small adjustments may be made based on other confidential information on stocks or non-fertiliser use of imported urea.

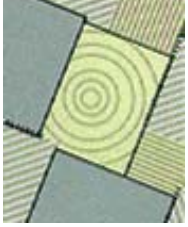
These AIC usage figures are compared to usage figures derived from BSFP and June crop area figures and the relationship between the ratios of N, P and K from both sets of data are checked and compared. Any inconsistencies or anomalies identified in the data are identified and followed up and any necessary corrections are made to ensure comparability and consistency across all data.

Each year the AIC figures are reviewed and quality assured for credibility and consistency across sources by a group of experts contributing knowledge on production, use and trade. The final agreed aggregated total UK usage figures are subject to independent peer review and checked for consistency and trend analysis, taking into account known agronomic and market factors.

The total fertiliser use is then split by country. The figures for Northern Ireland are taken from their fertiliser survey and the remaining GB figures are split between England plus Wales and Scotland by applying the proportions derived from the BSFP data. The NI Survey provides data by quarter amalgamated by calendar year.

A2.6 REVISIONS

The figures presented in this report are finalised. We will provide information on any revisions we make to the report or the datasets if any inaccuracies or errors occur.



A2.7 DEFINITIONS OF TERMS

1. For the purpose of the Survey, the term **Great Britain** (or **Britain**) is defined to cover England (including the Isle of Wight), Wales (including Anglesey) and mainland Scotland.

2. The **survey year** ran from autumn 2012 to autumn 2013, corresponding to the 2013 season or harvest year. The recording period for fertiliser applications varied for different crop and grass groups on farms of not less than 20 hectares (ha) in size.

3. For the purposes of this survey, a **field** is defined as any single area of land measuring more than 0.2 ha (half an acre) which had a uniform cropping and fertiliser history from autumn 2012. For data collection and processing purposes, separate fields with identical cropping and fertiliser management on the same farm are blocked together as one 'field', to represent the total combined area of those fields. Areas within the same natural boundary receiving different treatments (crops on fertilisers) were recorded separately. Agricultural land which had been set-aside under the Single Payment Scheme was recorded, but was not included in analyses unless it was used to grow an industrial crop. Fallow land other than set-aside has always been collected by the survey, but is not included in the calculations of this report.

4. In the report, **tillage** is defined as all crops except grass, forestry, glasshouse crops and uncropped land designated as 'set-aside' under the Single Payment Scheme. **Grass** refers to all forms of grassland which may be grazed, conserved or grown for seed production; rough grazing is excluded.

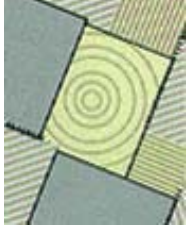
5. The abbreviation **N** is used for nitrogen; **P_2O_5** for phosphate; **K_2O** for potash, **SO_3** for sulphur and **FYM** for all types of organic manure e.g. slurries and solid manures. The phrase **total use** includes both straight (single nutrient) and compound (multi nutrient) products. Fertiliser products containing nitrogen and sulphur only are classified with straight nitrogen. Rates are expressed in terms of the equivalent nutrient content, taking into account the nutrient content in the product used. The nutrient content of the common fertiliser products including the dry matter content and nutrient content of various organic manures used are given in the Fertiliser Manual, RB 209 which is available on the Defra website.

6. For each fertiliser nutrient, the **average field rate** (of application) is defined as the sum of nutrient applied divided by the total area of those fields which received any dressing of the nutrient and is calculated based on the sown area rather than the total field area. Crop area without any application of the nutrient is excluded from the calculation of the average field rates of application. These field-specific application rates provide direct evidence on the level and variation in farming practice.

7. The term **dressing cover** is used to describe the proportion of crop area treated with any dressing of the fertiliser nutrient in question, and is stated as a percentage.

8. The **overall application rate** is defined as the total quantity of nutrient used, in kilograms (kg), divided by the total extent of crop area, in hectares (ha) (including any areas without application of the nutrient). The application rate is calculated on the basis of the sown area rather than the total field area.

   Any change in an overall application rate is due to a change in either the (actual) field rate of application used on farms, or to a change in the dressing cover, or to changes in both. Arithmetically, overall application rate is equivalent to the result of multiplying the average field rate of application by the proportion of crop area that receives any nutrient dressing. The overall application rate of a nutrient on a crop, by definition, cannot be greater than the average field rate of application.



9. The UK farm type system, which is based on the EU system, aggregates a wide range of defined farm types into ten 'robust' types:
   (1) Cereals
   (2) General Cropping
   (3) Horticulture
   (4) Specialist Pigs
   (5) Specialist Poultry
   (6) Dairy
   (7) Cattle and Sheep (LFA)
   (8) Cattle and Sheep (lowland)
   (9) Mixed
   (10) Other

   Prior to 2004, the UK agricultural departments amalgamated the robust types 'Specialist Pigs' and 'Specialist Poultry' as the single robust type 'Pigs and Poultry'. 2006 was the first year that the BSFP adopted the revised classification following analysis that showed this would not lead to under-representation of either of these farm types through marginalisation. The composition of 'robust' types is presented in greater detail in Appendix 3. The sampling framework outlined in Section A2.1 can be related to robust types as set out below.

   Revisons to the definitions of farm types can be found at the following link:

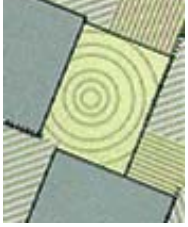
   https://www.gov.uk/structure-of-the-agricultural-industry-survey-notes-and-guidance

   Data presented in tables GB4.1 to GB4.5 are derived from the robust types shown below.

table number	*robust group in table title*	*robust type name*	*robust number*
GB4.1	cereal farms	Cereals	1
GB4.2	general cropping	General cropping and horticulture	2, 3
GB4.3	dairy farms	Dairy	6
GB4.4	other livestock	LFA and lowland grazing livestock	7, 8
GB4.5	mixed farms	Mixed	9

   These robust type groupings are also used in tables D2.3b, D3.2 and D4.2b. Due to the small number of specialist pigs and poultry farms interviewed in the survey, data collected from these robust types have not been presented in any of the tables listed above.

10. Regional analysis of the Survey data for England was classified in two ways in 2013. Table EW4.1a is based on the **Government Office Regions** (GORs) in common with other Defra surveys. Table EW4.1b is based on the former MAFF administrative regions, which were revised in 1996 to take account of changes to county boundaries and nomenclature resulting from the introduction of Unitary Local Authorities between April 1995 and April 1998. These revised regions, termed **BSFP regions**, have been the basis for regional analysis within the survey historically and are detailed in Appendix 2.



A2.8 TYPES OF FERTILISER

Of the 16 essential plant nutrients, the four key ones required in relatively large amounts in order for crops to achieve their maximum yield potential are nitrogen, phosphorus, potassium and sulphur. Where nutrients are not available in sufficient quantity in the soil, fertiliser products are applied to supply the nutrient needs of the plant. Plant roots take up the nutrients dissolved in the water in the soil. The nutrients must be in the correct chemical form so that they are in a suitable water soluble form in order for plants to be able to use them.

There are two broad types of fertiliser. Manufactured fertilisers tend to be relatively concentrated and supply essential nutrients in a chemical form which are immediately available for plant use. The other type is organic fertilisers which can be plant or animal based such as manure, slurry, compost or poultry litter. They are in their natural form or have undergone minimal processing. They are usually less concentrated than manufactured fertilisers, and often the nutrients they contain may need further breaking down in the soil by bacteria and other soil organisms before they are in a form available to plants. The chemical composition can vary greatly and they tend to be slower acting and less predictable in their action.

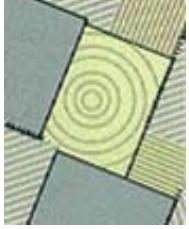
Nitrogen is important for building DNA and proteins in plants. It encourages growth of stems and leaves by promoting protein and chlorophyll. Provided there are adequate supplies of water and other nutrients, nitrogen usually has a large effect on crop growth, yield and quality. Whatever the source, to be usable by plants, it has to be in the form of inorganic ammonium or nitrate ions. The main forms of inorganic nitrogen fertilisers are ammonium nitrate, urea, ammonium phosphates and ammonium sulphate.

Phosphorus is essential for photosynthesis and respiration. It promotes early root formation and growth and enhances seed and fruit production. It is also important for energy production and storage. In the context of fertilisers it is measured and defined as P_2O_5. Phosphate fertilisers include ammonium phosphate and superphosphate. The majority of phosphorus in most soil is in essentially insoluble forms, and unavailable to plants. Phosphorus is very immobile in soil and the forms that are created and their availability are dependent on factors such the soil pH, temperature and moisture. Plant roots take up nearly all phosphorus as either the primary or secondary orthophosphate anion ($H_2PO_4^-$ or HPO_4^{-2}, respectively). Generally the maximum availability of phosphorus occurs in soils within a pH range of 6.0-7.0.

Potassium contributes to many plant functions apart from managing the water status, including shoot and root tip growth, cell extension, photosynthesis and the reduction of drought and disease stress. It is used in the process of building and transporting starches, sugars and proteins so is important for grain and fruit yield. Potassium chloride (commonly called muriate of potash) is the most common form of potassium fertiliser used in agriculture. Other forms include potassium sulphate, potassium magnesium sulphate and potassium nitrate. In the context of fertilisers it is measured and defined as K_2O. It is usually taken up from the soil in greater quantities than the other main fertilisers and crops which are harvested green such as grass and green vegetables will remove relatively large quantities of potassium from the soil.

Sulphur is an essential plant nutrient. It is a component of most proteins and it activates certain enzyme systems. In the past sulphur demand was satisfied through atmospheric deposition. With the significant decline of sulphur from the atmosphere, there is a need for sulphur application to crops and grass and it is often applied together with nitrogen fertilisers. Crops such as oilseed rape are particularly sensitive to sulphur deficiency and consequently require a relatively high input of sulphur.

More details are provided in The Fertiliser Manual (RB209) which is available on the Defra website.



A3 GENERAL TRENDS AND ISSUES

A3.1 CROP AREAS AND WEATHER CONDITIONS

Annual changes in relative cropping areas, as well as any changes in fertiliser practice for individual crops, may affect nutrient application rates when aggregated across the main crop groupings. Table A3.1 provides a summary of June Agricultural Survey estimates for areas of individual major crops, crop groupings and total tillage and grassland categories in 2011/12 and 2012/13, and illustrates percentage changes in relative cropping areas over the past five years. There were about 11 million hectares of managed agricultural land in Britain in 2013, of which 4.6 million hectares (42%) were cultivated for tillage cropping and the remainder, 6.4 million hectares, were grassland (excluding rough grazing).

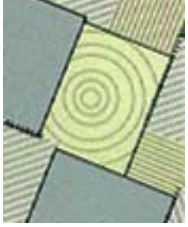
The Single Farm Payment was introduced on 1 January 2005, replacing all the previous main Common Agricultural Policy (CAP) payment schemes with a single payment. To obtain this single payment, farmers must demonstrate compliance with a number of measures designed to protect the environment. One potential impact of cross-compliance, and of environmental schemes, is that margins of fields will remain un-cropped. In this report, as was the case in for the last 7 years, all calculations of fertiliser rates have been made on the basis of sown area rather than field size.

Table A3.1 Cropping and grassland areas ('000 ha) in Great Britain, 2012 – 2013

Crops	June 2012 '000s ha	June 2013 '000s ha	% change since 2012	% change since 2008	2013 crop areas as % of total tillage area
Wheat	1982	1607	-18.9	-22.3	34.9
Barley – winter	379	305	-19.5	-25.6	6.7
– spring	597	883	47.9	48.2	19.2
Total cereals[1]	*3105*	*2992*	*-3.6*	*-7.5*	*65.1*
Oilseed rape – total	754	714	-5.3	19.1	15.5
Oilseed rape – winter	743	620	-17	na	13.5
Oilseed rape – spring	12	95	696	na	2.1
Sugar beet	120	117	-2.5	-2.5	2.5
Potatoes[2]	145	134	-7.6	-2.2	2.9
Linseed	28	34	21.4	112.5	0.7
Peas/beans[3]	119	146	22.7	-1.4	3.2
Maize/other fodder	221	276	24.9	29.0	6.0
Vegetables	122	146	19.7	21.6	3.2
Total tillage[4]	*4684*	*4599*	*-1.8*	*-1.8*	*100.0*
Set-aside and bare fallow[5]	152	254	67.1	30.9	
Grassland					2013 grass areas as % of total grass area
Less than 5 years old	1223	1251	2.3	22.2	19.5
5 years and older	5154	5153	0.0	-3.9	80.5
Total grass[6]	*6376*	*6404*	*0.4*	*2.7*	*100.0*
Total crops and grass[7]	*11060*	*11002*	*-0.5*	*-0.6*	

[1] including minor cereals (oats, rye, triticale, mixed corn).
[2] early + maincrop potatoes.
[3] harvested dry for animal consumption or, for peas, human consumption.
[4] including other crops, but not bare fallow or set-aside.
[5] the obligatory set-aside rate for the 2012 and 2013 Single Payment Years was set at 0%.
[6] managed grassland, excluding rough grazing.
[7] total tillage + total grassland.

Source: Annual Defra/Scottish Government/Welsh Assembly Government (WAG) June Agricultural Survey data



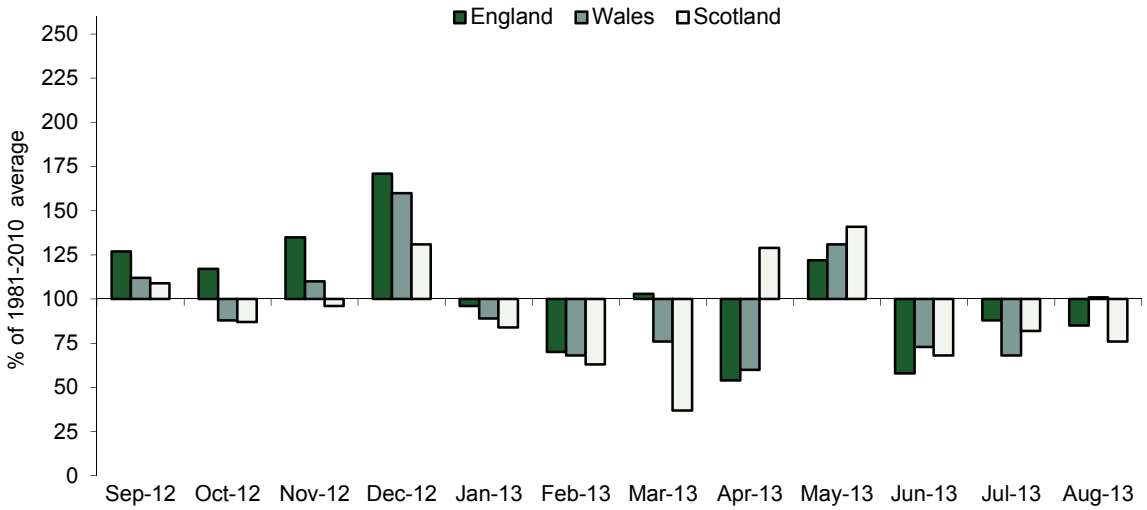
Comparing the 2012 and 2013 cropping years, the most marked change was the reduction in the area of winter cereals and winter oilseed rape. Drillings of these crops, and their survival through the winter, were markedly affected by the poor weather conditions experienced in the autumn of 2012. Spring sown crops increased in general, with spring barley up by 48% over 2012. The total area under tillage crops decreased by 1.8% in 2013, whilst the total area of uncropped land (bare fallow and set-aside) increased by 67.1% in 2013. This was predominantly caused by an increase in land left as bare fallow in England, with the obligatory set aside area remaining at zero in all three countries. Further comment on cropping trends is difficult, as the weather conditions affected cropping plans on many farms.

Unusual seasonal weather conditions can influence fertiliser usage in some years. For example:

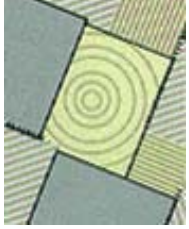
- A very wet (or very dry) autumn might delay the establishment of winter sown crops, or alter the ratio of winter to spring sown crops, with their different fertiliser requirements.
- Prolonged wet weather can increase leached losses of some nutrients, particularly nitrogen and sulphur. Weather conditions also affect other aspects of soil chemistry and nutrient availability.
- Adverse weather conditions can disrupt planned activities, such as fertiliser spreading.
- Growing conditions determine plant growth and can therefore affect nutrient requirements.

In the autumn of 2012 conditions were much wetter than average, with England and Wales receiving 131% of normal rainfall, although in Scotland it was 93% of the long term average (1981-2010). It was also the coldest autumn since 1993. Mild weather occurred in December and January, with conditions then turning colder through to the end of February. It was the wettest December since 1999, with 149% of average rainfall and widespread flooding. January and February were drier than average, but there was widespread snowfall in mid January. March was colder than any of the winter months. Any periods of warm weather were very short lived, overall this was the coldest spring since 1962. There was late season snowfall in late March and early April. The spring was a little drier than the long term average, with April dry across much of England and Wales, then turning wetter going into May. The summer period was the warmest since 2006, but was only marginally warmer than the long term average. There was a prolonged heatwave in July, when high pressure established across the UK. Summer in the UK was drier than the long term average, with parts of the South and East Anglia receiving less than half of average rainfall. The season ended a run of six generally wet and dull summers from 2007-2012. It appears that cold spring conditions delayed fertiliser applications, with proportionately less being applied in March and proportionately more in April and May than in the preceding two years (Table GB3.0).

Figure A3.1 Monthly rainfall as a % of the long term average[6]



[6] www.metoffice.gov.uk/climate/uk



The wet weather conditions observed in the autumn of 2012 did cause some fields of winter sown crops to fail. As these fields were not growing for an entire cropping year they have been exluded from the analysis, so as to avoid an atypical dilution of rates. The exceptions to this are tables GB/EW/SC3.0 in Section C, where total product and nutrient quantities are shown.

When the weather affects the proportion of winter to spring crops (notably cereals and oilseed rape) this can have a major impact on fertiliser use because lower-yielding spring crops often require less fertiliser. In 2013 the balance between winter and spring sown crops was atypical. The impact of all of these factors on fertiliser use are discussed in Section B of this report.

SECTION B

COMMENTARY ON FERTILISER USE IN GREAT BRITAIN

This commentary refers to rates of application in mainland Britain of fertilisers containing nitrogen (N), phosphate (P_2O_5), potash (K_2O) and sulphur (SO_3) on tillage crops and grassland (excluding rough grazing). Section B1 of the report covers the five-year period 2009-13. Comments on longer term trends are made in Section B2.

The estimates of overall application rates from the survey relate to usage on farms during the 2012-13 growing season: they form a basis for estimating quantities of fertiliser used in Great Britain. The estimates of the average field rates provide a better indication than overall application rates of actual usage levels and also of any annual variation in fertiliser practice on farms. The overall application rate takes into account both the average field rate and the proportion of the crop area treated, giving an overview of the crop as a whole. The definitions of the terms used are set out in Section A of this report.

The statistics on the pattern of fertiliser practice reported for Great Britain largely reflect practice in England & Wales due to its greater area of total crops and grassland: about 9.6 million hectares in England & Wales and about 1.9 million hectares in Scotland. In what is otherwise a commentary on Britain as a whole, remarks on the separate regions are only made to highlight particular trends of interest. Readers interested in more detailed recent trends for individual crops in England & Wales or in Scotland can refer to tables presented in Section C. A summary of data from earlier years is available in Chalmers 2001[7] and historic data for the key data series are also available on the Defra web site.

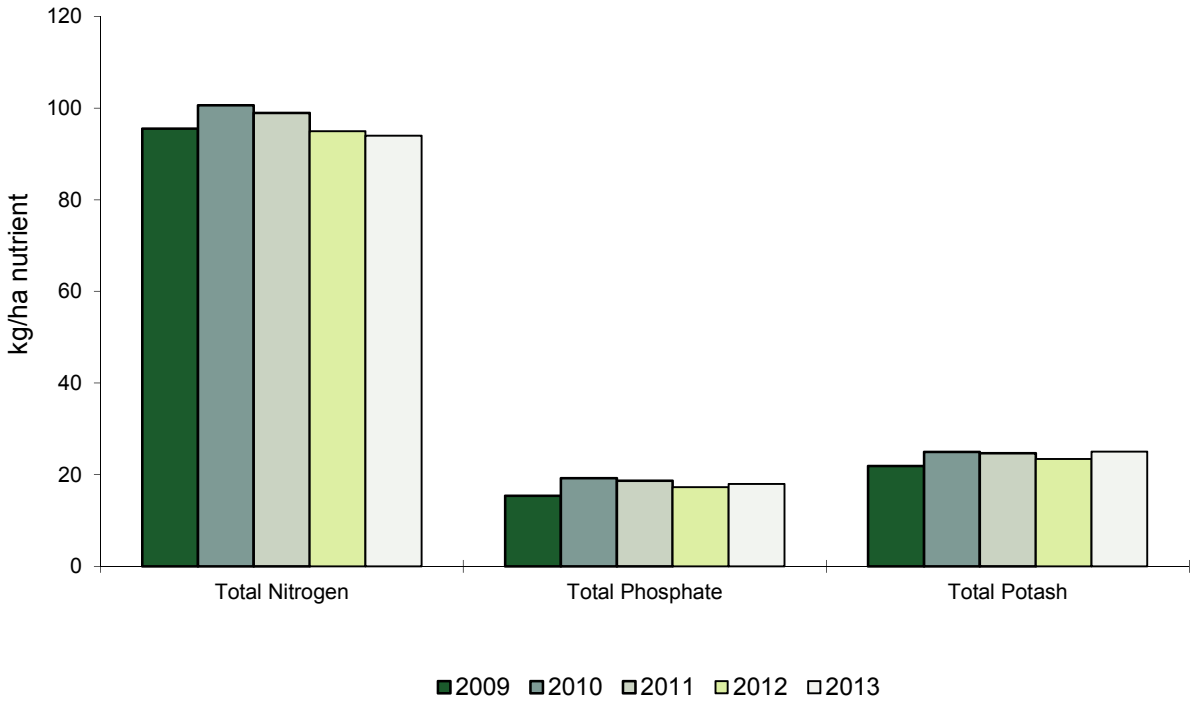
[7] Chalmers A. G. (2001) A Review of fertiliser, lime and organic manure use on farm crops in Great Britain from 1983 to 1997. *Soil Use and Management* **17**, 254-262.

B1 2013 RESULTS FOR GREAT BRITAIN AND CHANGES IN RECENT YEARS

B1.1 OVERVIEW OF FERTILISER USE ON ALL CROPS AND GRASS

Overall rates of total nitrogen, phosphate and potash in Great Britain over the last five years are illustrated in Figure B1.1. Whilst the data showed a trend of a declining overall application rate on all crops and grass for nitrogen until 2008, the rate then increased as fertiliser prices fell from their historically high level in 2008/9. The 2013 overall rate for all crops and grass is 94 kg/ha, the same as was reported in 2008. Overall rates for phosphate and potash declined until 2009, then stabilised, with slight increases in 2013 to 18 kg/ha and 25 kg/ha respectively. Application rates for straight and compound nitrogen applied on crops and grassland are also presented in Table B1.1.

Figure B1.1 Overall fertiliser use (kg/ha) on all crops and grass, Great Britain 2009 – 2013

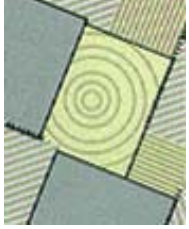


B1.1.1 Nitrogen

All crops and grassland

Table B1.1 Overall nitrogen use (kg/ha), Great Britain 2009 – 2013
Total nitrogen

	tillage crops	*grass*	*all crops and grass*
2009	137	57	95
2010	145	63	101
2011	146	57	99
2012	144	55	95
2013	136	59	94



Straight nitrogen

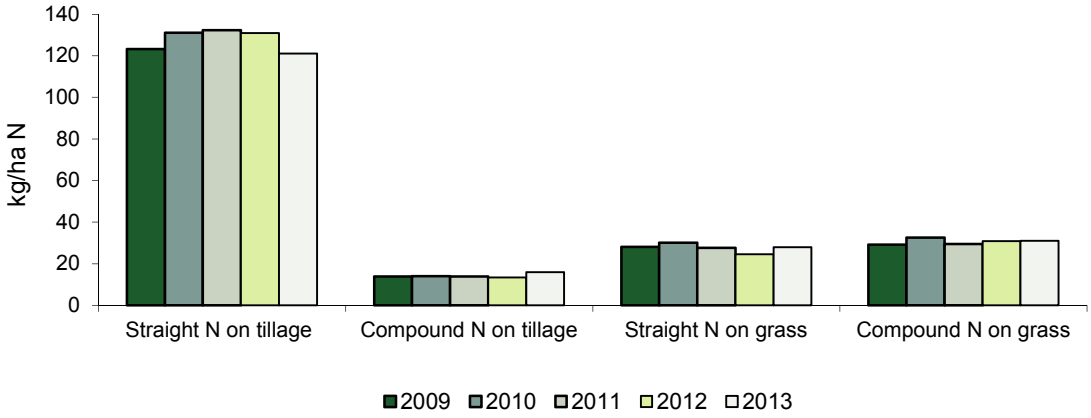
	tillage crops	*grass*	*all crops and grass*
2009	123	28	74
2010	131	30	77
2011	132	28	77
2012	131	25	72
2013	121	28	69

Compound nitrogen

	tillage crops	*grass*	*all crops and grass*
2009	14	29	22
2010	14	33	24
2011	14	29	22
2012	13	31	23
2013	16	31	24

The 1 kg/ha decrease in total nitrogen use on all crops and grassland (Figure B1.1) was caused by a large decrease in the overall rates on tillage crops. Whilst whole failed fields have been excluded from this analysis, it is likely that partially failed and generally poor tillage crops, contributed to this reduction. Failed fields are those where the crop did not develop and grow normally through to harvest. All tillage also included an increased area of spring crops where nitrogen rates are lower. On grass the overall application rates increased for straight N by 3 kg/ha, whilst compound N was the same as in 2012 at 31 kg/ha. On tillage crops the rate of straight N decreased by 10 kg/ha to 121 kg/ha whilst the rate of compound N increased by 3 kg/ha. The overall rate of compound N on all crops and grass is stable at 22-24 kg/ha over the five year period 2009-13.

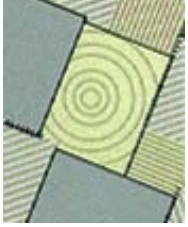
Figure B1.2 Overall straight and compound nitrogen use (kg/ha), Great Britain 2009 – 2013



Tillage crops

Straight N continues to be the main source of nitrogen on tillage crops, with the proportion of tillage area receiving a straight nitrogen dressing at 83% in 2013, the same as in 2012. The reduction in the overall application rate was therefore caused by the 12 kg/ha reduction to the average field rate, which was 145 kg/ha in 2013.

There are a number of reasons for the dominance of straight nitrogen over the use of nitrogen in compound fertilisers, with the principal being the large area of winter-sown crops. As is shown in Table A3.1, about 57% of the tillage area is sown to winter cereals and oilseed rape. These crops will receive most of any necessary dressings of phosphate and potash in the seedbed or during the autumn and winter, leaving just the nitrogen (and sulphur) to be applied, usually as more than one dressing, during the busy spring period of active crop growth. The need for precise timing of nitrogen applications has also contributed to a growing separation of nitrogen applications from those of other nutrients for spring-sown crops, especially spring cereals and sugar beet. Thus a continuing increase in the use of straight nitrogen now applies to spring-sown crops, including potatoes, for agronomic and environmental reasons, as well as for the optimisation of logistics and the efficient use of time in the spring.



Grassland

In 2012 the overall nitrogen application rate of 55 kg/ha was the lowest reported for the whole survey period since 1983 (see section B2). The 4 kg/ha increase to the overall N application rate in 2013 was due to a higher proportion of the grass area receiving a dressing of straight N and a slight increase in the compound N dressing cover. The average field rate of straight N increased by 6 kg/ha to 100 kg/ha, whilst the compound N average field rate decreased by 1 kg/ha to 74 kg/ha.

B1.1.2 Phosphate and Potash

Phosphate

Table B1.2 shows overall phosphate applications for the past five years. The 2009 rates were the lowest since this data set began in 1983 for both tillage (23 kg/ha) and grass (9 kg/ha). This trend was reversed on tillage crops in 2010 with an increase to the overall rate of 7 kg/ha. The 2013 phosphate rate on tillage was the same as in 2012 at 28 kg/ha, with a slightly increased proportion receiving a dressing (48%) and average field rate (59 kg/ha). For grassland the overall rate has been more stable, and 2013 saw a 1% increase in dressing cover and an unchanged average field rate of 22 kg/ha. The five year means for overall phosphate rates for tillage crops and grass were 27 and 9 kg/ha respectively.

Table B1.2 Overall phosphate and potash use (kg/ha), Great Britain 2009 – 2013

Total phosphate

	tillage crops	*grass*	*all crops and grass*
2009	23	9	15
2010	30	10	19
2011	29	9	19
2012	28	9	17
2013	28	9	18

Total potash

	tillage crops	*grass*	*all crops and grass*
2009	33	12	22
2010	38	14	25
2011	39	12	25
2012	37	12	23
2013	40	13	25

Potash

As with phosphate, overall potash use in 2009 fell to the lowest ever recorded by the Survey on tillage crops (33 kg/ha) and grassland (12 kg/ha) alike. By 2013 the overall potash rate had increased to 40 kg/ha on tillage crops, and on grassland the overall rate increased by 1 kg/ha to 13 kg/ha. On tillage crops the proportion of the area receiving a dressing of potash increased by 4% to 51%, whilst the average field rate decreased by 1 kg/ha. On grass dressing cover increased slightly to 43% and the average field rate was unchanged at 29 kg/ha.

B1.2 FERTILISER USE ON MAJOR TILLAGE CROPS

Overall and average field rates of fertiliser application for major tillage crops in Great Britain over the past five years are summarised in Tables B1.3 and B1.4. More detailed statistics for 2013 are presented in Section C. Longer term trends in overall application rates of nitrogen, phosphate and potash since 1983 are summarised in Section B2.

Small apparent changes in fertiliser use on individual crops should be treated with caution as these estimates are based on a smaller number of farms and fields than the aggregate estimates for all tillage crops. Information on sampling errors, which help in judging whether apparent changes may be real or attributable to sampling variation alone, is given in Appendix 1.

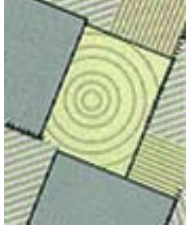


Table B1.3 Overall fertiliser use (kg/ha) on major tillage crops, Great Britain 2009 – 2013

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	184	99	137	162	182	91
2010	188	97	140	132	192	86
2011	188	99	138	158	192	86
2012	184	99	143	135	186	95
2013	183	108	142	173	177	94

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	177	68	127	50	175	86
2010	180	63	125	33	185	80
2011	181	67	126	48	184	78
2012	177	63	133	43	179	88
2013	177	77	130	56	169	87

Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	7	31	10	112	7	4
2010	8	34	15	99	7	7
2011	7	32	12	110	8	8
2012	7	37	10	92	7	7
2013	7	31	12	116	8	7

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	17	29	22	134	20	19
2010	27	35	33	118	29	28
2011	28	34	30	114	26	26
2012	25	34	30	103	25	23
2013	26	31	27	121	27	24

Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	23	41	34	233	23	72
2010	31	46	47	200	29	78
2011	33	45	46	197	27	76
2012	31	47	41	192	27	70
2013	32	46	41	225	28	74

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a,c]	*oilseed rape* [b]	*sugar beet*
2009	18	13	22		47	18
2010	22	17	21		54	13
2011	25	16	21		61	13
2012	28	17	25		63	12
2013	29	19	27		59	27

[a] Figures for maincrop potatoes include second earlies.

[b] Single crop grouping for the combined winter and spring oilseed rape areas.

[c] Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. These applications cannot be separated from those intended as a fertiliser nutrient.

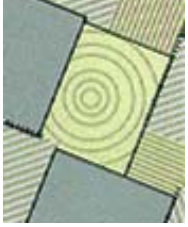


Table B1.4 Average field rates (kg/ha) on major tillage crops, Great Britain 2009 – 2013

Total nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	187	102	139	174	183	94
2010	190	102	142	135	193	91
2011	190	103	139	164	192	90
2012	187	104	144	142	186	98
2013	186	110	145	179	178	96

Straight nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	184	92	134	120	179	91
2010	187	91	133	78	189	87
2011	187	90	134	87	186	85
2012	184	86	140	81	181	96
2013	182	95	139	99	170	93

Compound nitrogen	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	71	60	64	133	37	39
2010	62	59	62	123	43	60
2011	68	59	66	130	38	75
2012	72	61	65	128	39	50
2013	61	64	67	149	37	48

Total phosphate	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	54	47	53	151	54	47
2010	60	49	55	135	60	57
2011	62	51	53	129	59	59
2012	61	48	57	134	57	59
2013	62	50	55	143	60	61

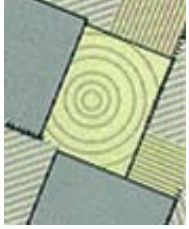
Total potash	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a]	*oilseed rape* [b]	*sugar beet*
2009	71	61	72	258	66	109
2010	72	64	73	226	67	111
2011	75	65	73	218	65	111
2012	77	63	72	247	68	110
2013	74	67	73	255	68	110

Total sulphur	*winter wheat*	*spring barley*	*winter barley*	*maincrop potatoes* [a,c]	*oilseed rape* [b]	*sugar beet*
2009	45	40	48		78	78
2010	54	40	48		85	50
2011	55	39	45		86	56
2012	54	39	50		86	59
2013	55	43	54		82	65

[a] Figures for maincrop potatoes include second earlies.

[b] Single crop grouping for the combined winter and spring oilseed rape areas.

[c] Sulphur rates on potatoes are not shown as some growers apply additional sulphur to acidify the soil for this crop. These applications cannot be separated from those intended as a fertiliser nutrient.



B1.2.1 Nitrogen

Overall rates of total nitrogen (Table B1.3) decreased between 2012 and 2013 for all the major tillage crops except spring barley where there was a marked increase of 9 kg/ha; the rate for oilseed rape fell by 9 kg/ha. These changes are most likely related to the cropping changes where winter crop failures resulted in higher plantings of spring barley and spring oilseed rape. The higher proportion of spring oilseed rape which requires less nitrogen would result in an overall lower rate on all oilseed rape. Average field rates (Table B1.4), which are unaffected by changes in dressing cover, followed a similar pattern; there were also small decreases observed for winter wheat and sugar beet. Rates for potatoes are more variable; the standard error for total nitrogen for the average field rate was 7.3 (see Appendix 1.1 for details).

Winter wheat

The field cropping information collected in the Survey enables separate estimates to be made of nitrogen fertiliser use on milling and non-milling (seed/feed) categories of winter wheat (Table B1.5). The difference between the rates applied to milling and non-milling wheats reflect differences in crop husbandry and nitrogen management practices.

Table B1.5 Average field application rates (kg/ha) of nitrogen on cereals by market use, Great Britain 2009 – 2013

Total nitrogen

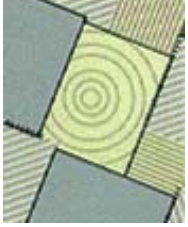
	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
2009	206	177	104	98	135	141
2010	212	179	106	96	127	149
2011	212	180	107	97	129	144
2012	217	176	110	93	129	152
2013	208	177	110	110	131	151

Nitrogen fertiliser requirements for winter wheat depend on the intended market end use (grain N levels), as well as upon soil type and the residual soil nitrogen fertility from previous cropping and manure practice[10]. Milling varieties are often grown as a second wheat and often receive extra nitrogen, either as a solid dressing or as late foliar urea spray, which is applied to improve the chances of achieving an adequate grain protein content for a milling premium. High yielding feed crops, rather than lower yielding varieties of milling wheat, are often grown as a first winter wheat after a break crop such as oilseed rape. This is to exploit the potential yield and residual soil nitrogen benefits from the crop rotation, and also to avoid any risk of lower grain protein concentrations as a result of high yield diluting the grain nitrogen concentration for first wheat in the rotation. The average field application rate on milling wheat in 2013 was much lower than the rate in 2012 and just 2 kg/ha higher than the recent low rate recorded in 2009. The non-milling crop continues to dominate the wheat crop area (Table B1.6) with only 30% of the crop area in 2013 being grown as milling wheat (5 year mean: 32%).

Table B1.6 Percentage distribution (% crop area) of cereal crop areas by market use, Great Britain 2009 – 2013, as estimated from the Survey

	winter wheat		*spring barley*		*winter barley*	
	milling	*non-milling*	*malting*	*non-malting*	*malting*	*non-malting*
2009	33	67	57	43	34	66
2010	35	65	61	39	29	71
2011	33	67	62	38	34	66
2012	27	73	63	37	32	68
2013	30	70	51	49	29	71

[10] Anon. (2010). *Fertiliser Manual (RB209),* Defra, 8th edition. The Stationery Office, London. ISBN 978-0-11-243286-9. For the latest release see the Defra web site: https://www.gov.uk/government/publications/fertiliser-manual-rb209



Spring barley

Overall use of total nitrogen on spring barley increased by 9 kg/ha in 2013 to 108 kg/ha. This is the highest reported rate since 2002, and it increased the 5 year mean to 101 kg/ha. The overall application rate of straight nitrogen increased to 77 kg/ha, whilst the overall application rate for compound N decreased to 31 kg/ha. The overall increase was caused by an increased percentage of the spring barley area receiving a dressing of straight N (81% in 2013 compared to 73% in 2012). The average field rate for total nitrogen was 110 kg/ha in 2013, well above the five year average of 104 kg/ha.

Further analysis of the data by crop type (Table B1.5) shows the average rate applied to the spring malting crop was the same as in 2012 at 110 kg/ha. For non-malting crops the nitrogen application rate increased markedly to 110 kg/ha, with a five year mean of 99 kg/ha.

Estimated nitrogen rates on spring barley crops had been consistently slightly higher on malting than non-malting crops, with a mean difference of 9 kg/ha over the last five years. This slightly higher use of nitrogen on malting than non-malting crops may seem anomalous, since lower rates of nitrogen are recommended for malting barley, under the same conditions of soil type and nitrogen fertility level, than for the feed varieties of barley. This recommendation is made to avoid the risk of high grain nitrogen content, which would adversely affect subsequent malt quality. However, malting crops are normally grown on soils with low nitrogen fertility and the average field rates of nitrogen reported for malting varieties in Table B1.5 are generally in the range recommended for mineral soil types with low nitrogen residues (70 - 120 kg/ha)[11]. Feed crops on the other hand are often grown within mixed rotations, which tend to have a higher soil nitrogen fertility, with consequently less need for nitrogen fertiliser. In 2013 the average field rate of nitrogen was the same on malting and non malting crops, which was unusual. It could be the case that the increased area of spring barley meant that it was grown on fields where it was unplanned, with lower nitrogen residues so required additional nitrogen.

The proportion of spring barley grown for malting has fluctuated during the last five years (Table B1.6). The mean for the period 2009-12 is 61%, but decreased to just 51% in 2013.

Winter barley

In the period 2002-08 overall total nitrogen use on winter barley decreased from year to year, down to 132 kg/ha in 2008. This rate has increased albeit with some fluctuations to 142 kg/ha in 2013. The straight nitrogen rate decreased by 3 kg/ha whereas the compound nitrogen rate increased by 2 kg/ha in 2013.

Nitrogen requirements for winter barley, as with the spring sown crop, depend on a range of agronomic factors, including the intended market for the grain. Average field rates of nitrogen on malting crops increased by 2 kg/ha to 131 kg/ha in 2013 giving a five year mean of 130 kg/ha. For non malting crops the average field rate decreased by 1 kg/ha to 151 kg/ha in 2013 (Table B1.5), with the 5 year average being 147 kg/ha.

The higher application rates of nitrogen (five-year mean of +17 kg/ha) on non-malting, compared to malting winter barley crops, reflect typical agronomic practice, and the gap between malting and non malting crops was comparable with previous years. The majority of winter barley crops (both feed and malting) are grown in England in arable rotations, usually after a previous cereal crop, when the soil nitrogen fertility status is low. Higher nitrogen rates are recommended for feed crops.

The proportion of relative crop area grown for malting was 29% in 2013, which was slightly less than in the recent past, with the five year mean calculated as 32%. (Table B1.6).

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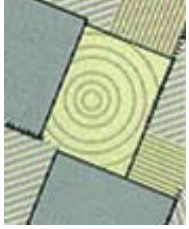
[11] Anon. (2010). *Fertiliser Manual (RB209),* Defra, 8th edition. The Stationery Office, London. ISBN 978-0-11-243286-9. For the latest release see the Defra web site



Maincrop potatoes

Total nitrogen use on maincrop potatoes has fluctuated over the last five years. Part of the reason for recent apparent fluctuations in the estimates of nutrient application rates may be because proportionally fewer fields of potatoes are covered by the Survey. This is due to the fact that fields of potatoes on respondent's farms may be let out and grown by a third party, so it is not possible to record information in the Survey. Furthermore, fields of potatoes grown by a respondent but not on his own farm are not captured in the Survey.

In 2013 the overall rate was at its highest for the period at 173 kg/ha, well above the five year mean of 152 kg/ha. (Table B1.3). This increase in 2013 is due to increases in the average field rates of straight and compound nitrogen (Table B1.4), as well as an increase in the area receiving straight or compound nitrogen fertiliser compared to the previous year (57% and 78% respectively compared to 53 kg/ha and 72 kg/ha in 2012).

Oilseed rape

In 2013, overall total nitrogen use on oilseed rape, as a combined category for both the autumn and spring sown crop, decreased by 9 kg/ha to 177 kg/ha (five year mean 186 kg/ha).

A more detailed breakdown of the data for oilseed rape (Table B1.7) shows that the average field rate of nitrogen on winter oilseed rape increased by 1 kg/ha between 2012 and 2013 to 188 kg/ha. The rate for the spring crop increased by 2 kg/ha to 121 kg/ha. In a normal year spring oilseed rape represents only about 2% of the total oilseed rape area. In 2013 spring oilseed rape represented about 13% of the area, and with typically lower nitrogen rates this has caused the decrease observed on the oilseed rape category as a whole.

Table B1.7 Average field application rates of nitrogen (kg/ha) on winter and spring oilseed rape, Great Britain 2009 – 2013

Total nitrogen (kg/ha)

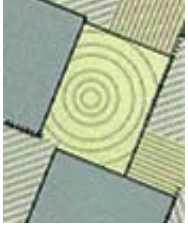
	winter oilseed rape	*spring oilseed rape**
2009	187	112
2010	195	121
2011	193	142
2012	187	119
2013	188	121

* Spring oilseed rape data are more variable due to smaller crop area

.

Sugar beet

The overall nitrogen use on sugar beet decreased by 1 kg/ha in 2013 to 94 kg/ha, slightly over the five year mean (90 kg/ha). The proportion of crop area receiving a nitrogen dressing was 99%, slightly higher than in recent years. The average field rate of compound nitrogen fell by 2 kg/ha, although dressing cover with compound nitrogen is low at 16% of the sugar beet area in comparison to 94% dressing cover with straight N. The average field rate of straight nitrogen also fell by 3 kg/ha.



B1.2.2 Phosphate and Potash

Phosphate

In 2013 the overall phosphate rate increased on all the major tillage crops except winter and spring barley. Higher overall rates were caused by increased average field rates (Table B1.4); the average field rate was just lower for winter barley. Percentage dressing covers with phosphate reduced only on winter and spring barley, with others increasing or remaining the same as last year. The overall phosphate rate of 28 kg/ha for tillage crops is in line with the 2009-13 five year average.

Potash

Overall potash use on tillage crops increased in 2013 by 3 kg/ha, to 40 kg/ha. This goes against the trend of declining potash rates since 2008, when the overall rate was 43 kg/ha. The increase in overall potash rate on tillage crops in 2013 was caused by a 4% increase in the proportion of the crop area receiving a dressing, as the average field rate was slightly decreased between the two years. The average field rates for potash increased on spring barley, winter barley and potatoes. The average field rates were the same in 2013 as in 2012 for oilseed rape and sugar beet, with a decrease reported only on winter wheat. As noted for nitrogen, part of the reason for recent apparent fluctuations in estimates of nutrient application rates for potatoes may be because of the many fields which are grown by third parties and are not recorded, thereby reducing the robustness of the estimates.

B1.2.3 Sulphur

The Survey has collected detailed information on sulphur fertiliser use since 1993, when only 3-6% of the cereal crop area and 8% of the oilseed rape area received an application of sulphur. By 1997, the proportions of these crop areas which were treated with sulphur had increased markedly to 13-14% for cereals and 30% for oilseed rape. Dressing covers for sulphur then generally remained fairly static until 2002 when the areas increased steadily until 2007. 2008 saw reductions in dressing covers for cereals at 35%-43%, a pattern that continued in 2009, except in winter barley where sulphur dressing cover increased to 45%. In 2013 cereals dressing covers with sulphur were in the 43-53% range. In oilseed rape the 1% reduction in dressing cover makes it the second highest for the period. (Table B1.8). In 2013 average field rates increased in winter wheat spring barley winter barley and sugar beet and decreased on oilseed rape.

Table B1.8 Dressing cover (% area) and average application rate (kg/ha SO_3) of sulphur on cereals and oilseed rape, Great Britain 2009 – 2013

Dressing cover (%)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*	*all tillage*
2009	39	45	32	60	35
2010	42	44	42	64	40
2011	46	46	40	70	42
2012	52	51	45	73	47
2013	53	50	43	72	47

Average field rate (kg/ha SO_3)

	winter wheat	*winter barley*	*spring barley*	*oilseed rape*	*all tillage*
2009	45	48	40	78	53
2010	54	48	40	85	59
2011	55	45	39	86	60
2012	54	50	39	86	61
2013	55	54	43	82	58

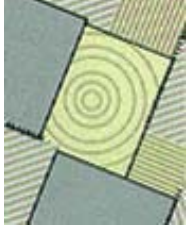


Table B1.9 shows the proportion of major tillage crops receiving a sulphur dressing in England & Wales compared with Scotland. Historically a higher proportion of cereal and oilseed crops was treated with sulphur in Scotland than in England & Wales which may have been due to the greater awareness of the risk of sulphur deficiency in Scotland due to historically extremely low levels of atmospheric sulphur deposition, compared to most other areas of Britain. Arable farmers in England & Wales became more aware of the need to apply sulphur and there was an increase in the percentage dressing cover figures for all major tillage crops between 2004 and 2007. In 2013 these percentage dressing increased slightly on cereals, but were slightly reduced on oilseed rape. In Scotland the dressing cover for winter wheat and winter barley was lower in 2013.

Table B1.9 Dressing cover (% area) of sulphur on cereals and oilseed rape by region, 2009 – 2013

		winter wheat	*winter barley*	*spring barley*	*oilseed rape*
England & Wales	*2009*	39	44	34	60
	2010	41	42	42	64
	2011	45	45	40	70
	2012	52	50	45	74
	2013	53	50	46	73
Scotland*	*2009*	54	55	30	67
	2010	56	52	41	61
	2011	58	50	39	68
	2012	61	54	44	49
	2013	45	45	39	53

* Scottish data may appear more variable due to smaller sample sizes.

B1.3 FERTILISER USE ON GRASSLAND

Overall fertiliser usage on grassland in Great Britain in the last five years, as previously shown (Tables B1.1 and B1.2), is summarised again in Table B1.10. The corresponding estimates of dressing cover and average field rates for each nutrient are shown in Table B1.11.

Table B1.10 Overall fertiliser use (kg/ha) on grassland, Great Britain 2009 – 2013

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2009	28	29	57	9	12	2
2010	30	33	63	10	14	2
2011	28	29	57	9	12	2
2012	25	31	55	9	12	2
2013	28	31	59	9	13	2

Dressing cover for total nitrogen on grass increased by 1% in 2013 at 62% (Table B1.11). The long term trend is for declining dressing cover for total nitrogen but the proportion receving a dressing remains above the 58% low reported in 2008. As in previous years, a higher proportion of grass received compound N as opposed to straight N, but the average field rate for compound N was three quarters of the straight N rate of 100 kg/ha.

Overall application rates for phosphate and potash on grass were at 9 and 13 kg/ha respectively.

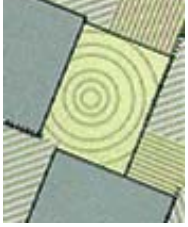


Table B1.11 Dressing cover (%) and average application rate (kg/ha) of fertiliser on grassland, Great Britain 2009 –2013

Dressing cover (%)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2009	28	39	59	38	39	5
2010	29	43	63	43	44	6
2011	28	41	61	41	42	6
2012	26	41	61	41	42	7
2013	28	42	62	42	43	8

Average field rate (kg/ha)

	straight nitrogen	*compound nitrogen*	*total nitrogen*	*total phosphate*	*total potash*	*total sulphur*
2009	100	76	98	23	30	29
2010	104	76	100	24	32	30
2011	98	72	93	22	29	36
2012	94	75	91	22	29	32
2013	100	74	96	22	29	33

The proportion of the grass area receiving a straight nitrogen dressing increased by 2%, to 28% and the compound N dressing cover increased by 1% to 42% in 2013. Dressing cover percentages of phosphate and potash increased by 1% to 42% and 43% of grass area for 2013. The five year means are 41% and 42% respectively.

Average field rates for phosphate and potash in 2013 remained at 22 kg/ha for phosphate and 29 kg/ha for potash in line with the historic low rates reported in 2011 and 2012.

B1.3.1 Nitrogen

Cutting and grazing management

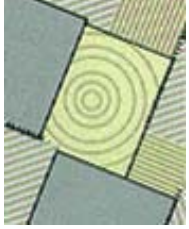
Fertiliser requirements for grassland vary according to the type of livestock enterprise, intensity of production and the associated cutting and grazing regimes used for sward management. Fertiliser use on dairy, other livestock and mixed farms in Great Britain in 2013 are presented in Section C. The Survey estimates of annual distributions of the total grassland area between grazing and cutting management regimes since 2009 are summarised in Table B1.12. These should not be taken as authoritative national estimates of grassland utilisation, as the Survey is designed to estimate fertiliser application rates, not to derive accurate crop areas, although these may still be the best available estimates of grassland utilisation by area.

Table B1.12 Grassland utilisation (% of grass area), Great Britain 2009 – 2013

	grazed [a]	*silage* [b]	*hay* [b]
2009	93	29	12
2010	91	31	12
2011	90	29	11
2012	90	28	10
2013	90	28	12

[a] May also be cut.

[b] May also be grazed.



Nearly all grassland is grazed at some stage during the season (Table B1.12) and the proportion in 2013 is slightly below the five year mean of 91%, but in line with the last 2 years.
Fertiliser usage for the different cutting and grazing categories is presented in Table B1.13. The differences in average field rates for each nutrient illustrate the influence of grassland management practice on fertiliser inputs with rates being lowest in grass cut for hay, higher in grass which is grazed and higher still in grass cut for silage.

Table B1.13 Nitrogen application rates (kg/ha) by grassland utilisation, Great Britain 2009 – 2013

Total nitrogen

	overall application rate				*average field rate*		
	grazed [a]	*silage* [b]	*hay* [b]		*grazed* [a]	*silage* [b]	*hay* [b]
2009	55	104	40	*2009*	95	124	82
2010	59	106	48	*2010*	96	127	82
2011	52	99	40	*2011*	89	121	71
2012	51	99	47	*2012*	87	117	75
2013	55	106	44	*2013*	91	124	77

Straight nitrogen

	overall application rate				*average field rate*		
	grazed [a]	*silage* [b]	*hay* [b]		*grazed* [a]	*silage* [b]	*hay* [b]
2009	27	48	23	*2009*	98	113	88
2010	29	50	24	*2010*	103	116	81
2011	26	46	21	*2011*	95	115	75
2012	22	43	25	*2012*	91	105	79
2013	26	50	21	*2013*	94	112	78

Compound nitrogen

	overall application rate				*average field rate*		
	grazed [a]	*silage* [b]	*hay* [b]		*grazed* [a]	*silage* [b]	*hay* [b]
2009	28	55	17	*2009*	73	96	67
2010	30	55	24	*2010*	72	97	71
2011	26	53	18	*2011*	68	94	55
2012	28	56	22	*2012*	71	97	64
2013	29	57	23	*2013*	71	96	64

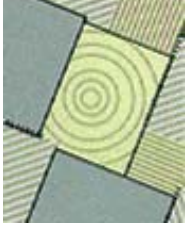
In 2013 the overall total nitrogen rate for the grazed category increased by 4 kg/ha to 55 kg/ha, with the rate on the silage category increasing by 7 kg/ha to 106 kg/ha.

Overall application rates and average field rates of straight nitrogen increased on grass which is grazed and on grass for silage in 2013. Rates on grass for hay decreased, but these should be treated with caution, due to the relatively low number of fields managed in this way. Compound nitrogen rates increased slightly for all categories of grass, especially for silage grass against low rates in 2012, but the long term trend remains downward. The five year means for the overall compound nitrogen rate are 28, 55 and 21 kg/ha for grazed grass, silage and hay respectively, a slight increase on last year's five year means.

The fall in nitrogen use over the long term on grassland is likely to be related in part to decreases in ruminant livestock numbers which may have reduced herbage production requirements.

[a] May also be cut.

[b] May also be grazed.



B1.3.2 Phosphate and Potash

Phosphate and potash requirements for grassland depend, as for nitrogen, on the system of sward management with overall application and field rates for both phosphate and potash being higher in grass cut for silage.

Table B1.14 Phosphate and potash use (kg/ha) by grassland utilisation, Great Britain 2009 – 2013

Total phosphate

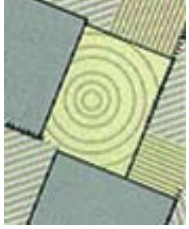
	overall application rate				*average field rate*		
	grazed [a]	*silage* [b]	*hay* [b]		*grazed* [a]	*silage* [b]	*hay* [b]
2009	8	15	7	*2009*	22	28	26
2010	10	16	10	*2010*	23	29	28
2011	8	15	7	*2011*	21	27	21
2012	8	15	8	*2012*	20	27	21
2013	9	16	8	*2013*	21	28	22

Total potash

	overall application rate				*average field rate*		
	grazed [a]	*silage* [b]	*hay* [b]		*grazed* [a]	*silage* [b]	*hay* [b]
2009	11	25	9	*2009*	29	42	33
2010	13	26	12	*2010*	30	44	33
2011	11	24	10	*2011*	27	41	27
2012	11	25	9	*2012*	27	41	26
2013	11	27	11	*2013*	27	44	29

Overall phosphate rates increased by 1 kg/ha on both the grazed and silage categories of grass in 2013 (Table B1.14). The corresponding five-year means for grazed grass, silage and hay were 9, 16 and 8 kg/ha, respectively. Average field rates increased by 1 kg/ha on all categories of grass.

Overall potash rates in 2013 were the same as the previous year on grass that was grazed and increased by 2 kg/ha on both grass cut for silage and for hay. The average field rate on silage grass increased by 3 kg/ha on silage grass and on that cut for hay.



B1.3.3 Sulphur

In 2013, only 8% of the total grassland area received a sulphur dressing (mean 6% for 2009-13 period). Of this, a higher proportion of grassland cut for silage is treated with sulphur compared to grazed grass or grass cut for hay (Table B1.15). Estimated dressing covers have fluctuated slightly in the past five years, with the all grass categories increasing by 1% in 2013.

The significant proportion of heavier textured soil types which occur in the main grassland farming areas, and assumed inputs of sulphur from slurry applications to silage fields, are among possible reasons for the consistently low level of sulphur fertiliser use on grassland.

Table B1.15 Sulphur use on grassland, Great Britain 2009 – 2013

Dressing cover (%)

	grazed [a]	*silage* [b]	*hay* [b]	*all grass*
2009	5	12	5	5
2010	6	11	5	6
2011	6	11	3	6
2012	6	14	7	7
2013	7	16	8	8

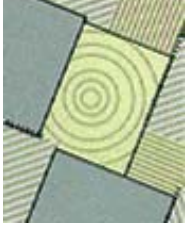
Average application rate per year (kg/ha SO_3)

	grazed [a]	*silage* [b]	*hay* [b]	*all grass*
2009	29	29	26	29
2010	29	32	36	30
2011	36	39	39	36
2012	31	34	23	32
2013	31	37	32	33

Estimated average field rates of sulphur application peaked for grazed and silage grass in 2007 at 45 kg/ha and 47 kg/ha and for hay in 2008 at 47 kg/ha. In 2013 average field rates increased on grass cut for hay or silage. The five year means are 31, 34 and 31 kg/ha SO_3 for grazed, silage and hay grassland, respectively (Table B1.15). Note that the average application rates in Table B1.15 are annual totals, not rates per cut.

[a] May also be cut.

[b] May also be grazed.



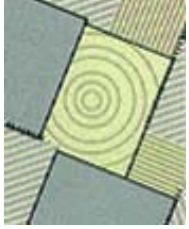
B2 LONGER TERM TRENDS FOR GREAT BRITAIN

B2.1 NITROGEN USE

The British Survey of Fertiliser Practice was first undertaken as an integrated British survey in 1992. Before then, the annual Survey of Fertiliser Practice had been carried out separately for England & Wales and for Scotland. Survey statistics from those earlier surveys have since been collated in order to report an aggregated series for nutrient use in Great Britain since 1983, when the survey in Scotland started.

Table B2.1 Total overall nitrogen application rates (kg/ha), England & Wales 1974 - 2013 and Scotland and Great Britain 1983 – 2013

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1974	85	-	-	91	-	-	89	-	-
1975	86	-	-	99	-	-	93	-	-
1976	96	-	-	98	-	-	97	-	-
1977	100	-	-	110	-	-	111	-	-
1978	105	-	-	113	-	-	114	-	-
1979	113	-	-	117	-	-	121	-	-
1980	121	-	-	119	-	-	120	-	-
1981	135	-	-	125	-	-	130	-	-
1982	141	-	-	123	-	-	132	-	-
1983	154	113	149	125	131	126	139	124	136
1984	162	121	157	132	127	131	147	125	143
1985	161	131	157	131	130	131	146	130	144
1986	156	119	152	135	120	132	146	120	142
1987	160	139	157	133	116	130	147	125	143
1988	149	125	146	116	132	119	133	129	132
1989	150	128	147	127	111	124	139	118	136
1990	149	131	147	132	116	129	141	122	138
1991	154	128	151	133	111	129	143	117	139
1992	147	125	145	104	111	106	126	116	125
1993	137	130	137	112	114	112	124	119	124
1994	149	128	147	117	112	116	133	118	130
1995	151	140	149	119	114	118	134	124	132
1996	148	122	145	118	100	115	133	108	128
1997	151	134	149	123	124	123	137	128	136
1998	146	131	144	107	119	109	127	124	126
1999	143	126	141	108	117	110	126	121	125
2000	154	135	149	95	110	99	124	118	123
2001	144	147	145	90	113	94	114	127	116
2002	153	143	150	85	105	89	116	119	117
2003	152	135	149	79	102	83	112	114	113
2004	150	133	148	73	93	77	108	107	108
2005	149	132	147	72	84	75	109	102	108
2006	145	119	142	69	86	72	106	98	104
2007	148	119	144	64	72	65	106	89	103
2008	141	109	137	52	66	55	97	81	94
2009	140	111	137	54	69	57	98	84	95
2010	149	113	145	62	64	63	105	80	101
2011	150	119	146	57	59	57	103	79	99
2012	147	121	144	54	60	55	98	79	95
2013	138	124	136	57	68	59	95	87	94



The aggregated data for Great Britain follow a similar pattern to that observed for England & Wales because a large proportion of both the tillage an grassland areas in Britain is located in England & Wales. Overall total nitrogen rates for tillage crops and grassland in England & Wales since 1974 and in Scotland and Great Britain since 1983 are summarised in Table B2.1. The data for Great Britain are presented graphically in Figure B2.1. Overall nitrogen use has been consistently higher on tillage crops than on grassland ever since the British survey started.

Apart from a dip in 1992-93 due to the introduction of set-aside, the overall rate of total nitrogen on tillage land stayed within the range 145-150 kg/ha with some wider fluctuations caused by factors such as changes in the crop area or changes in nitrogen applications to specific crops (see Figure B2.3). The rate for 2013 is outside that range, with the overall rate of nitrogen on tillage crops for Great Britain being 136 kg/ha. This fall is related to the weather and subsequent cropping patterns for 2013 which is explained on Section B1.1.1.

Nitrogen levels applied to grassland have always been lower than tillage crops. From 1983 until 1999, the difference was fairly constant, averaging 27 kg/ha. Since 2000, the overall applications made to grass have fallen consistently relative to those made to tillage crops, and for the last five years the average difference in overall nitrogen rate is 83 kg/ha. The recent decline in cattle numbers is thought to have contributed to this reduction in the nitrogen rate on grassland, possibly in conjunction with some improvement in manure use efficiency, encouraged by a higher nitrogen fertiliser price.

Data on straight and compound nitrogen for Great Britain are not available for the period 1983-91 when the survey in Scotland was separate from the one in England & Wales. Figure B2.2 shows the overall rates of straight and compound nitrogen on tillage crops and grassland. Most of the total nitrogen fertiliser used on tillage crops each year has been applied in straight form. There is a marked difference for grassland where compound nitrogen accounts for around two thirds of the total applied.

Figure B2.1 Overall application rates (kg/ha) of total nitrogen on tillage crops and grassland, Great Britain 1983 – 2013

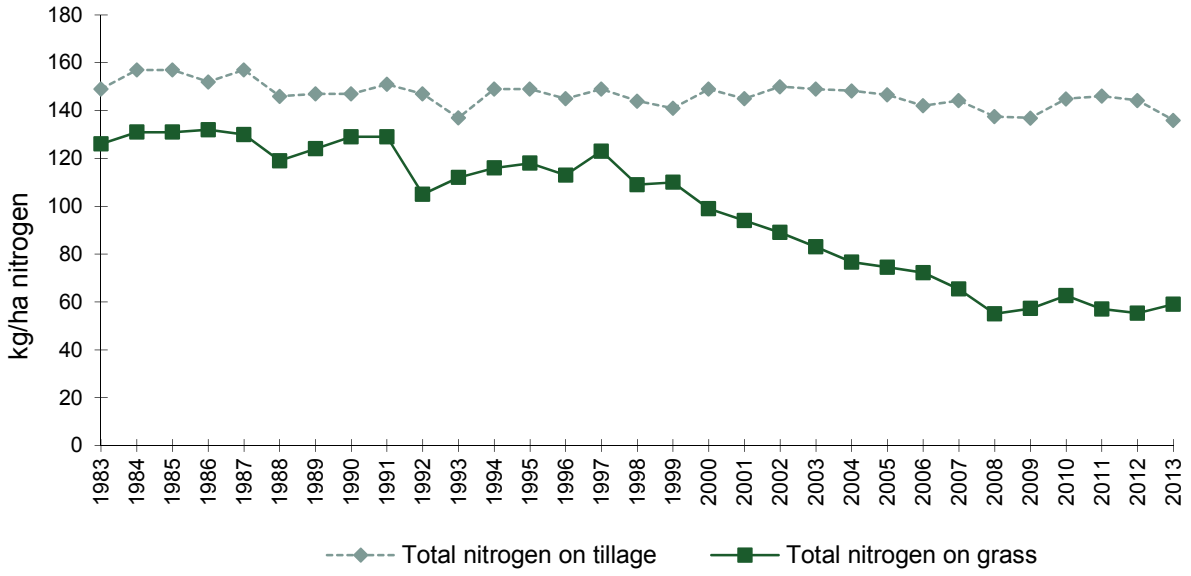
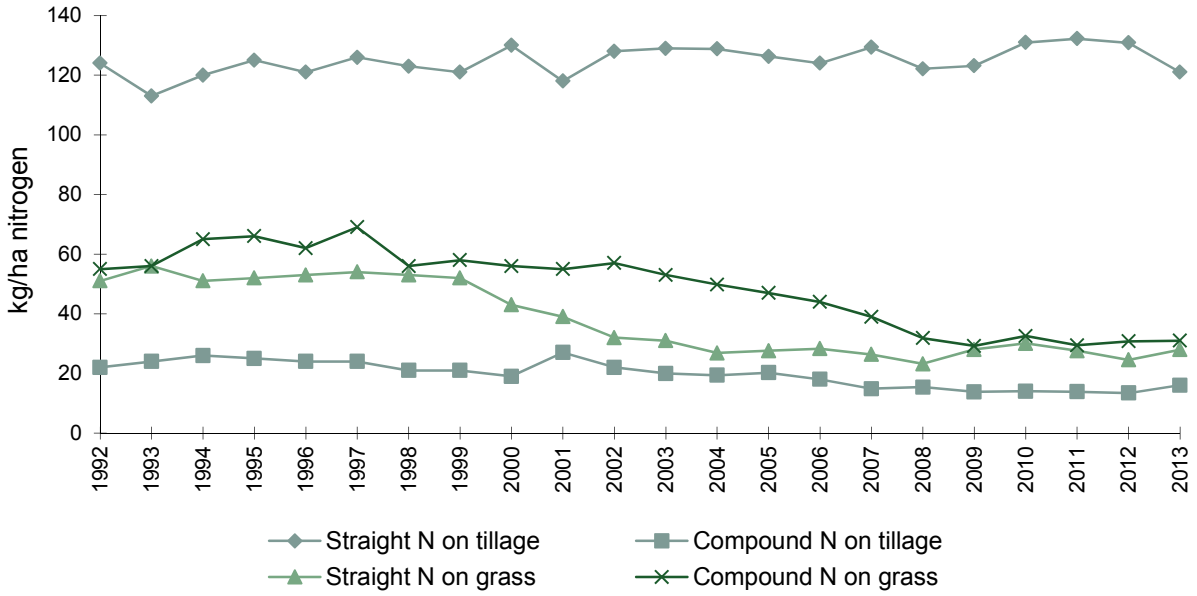


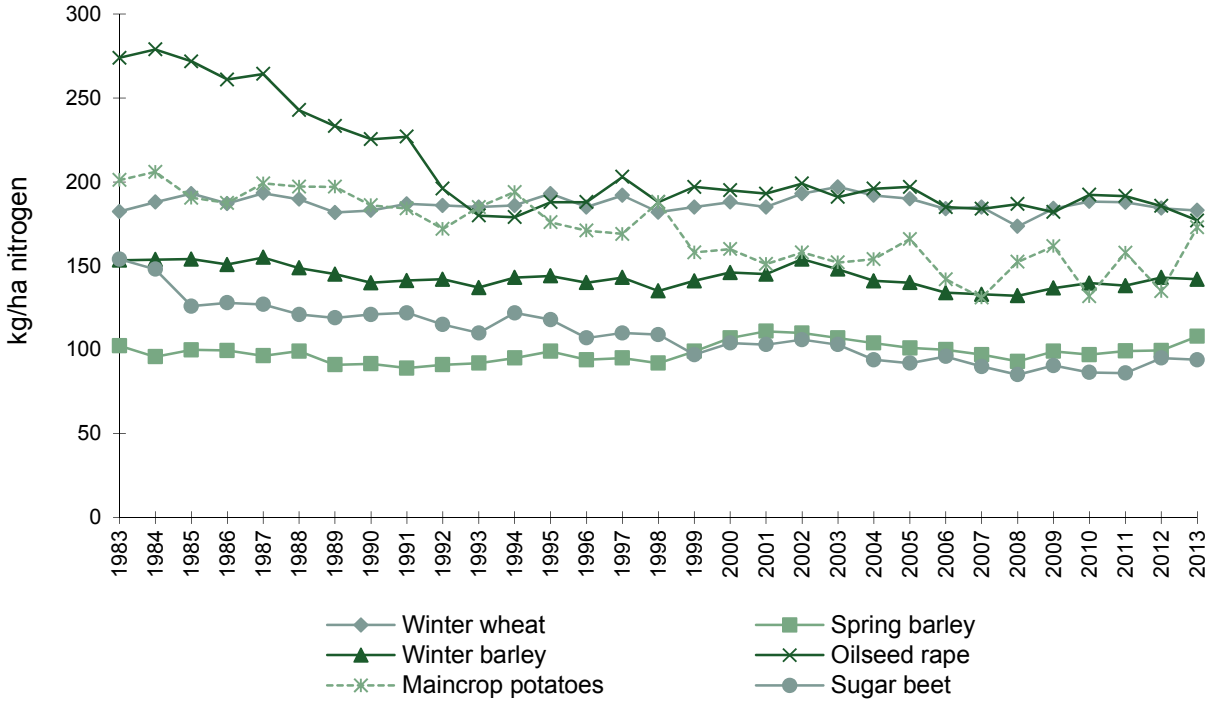
Figure B2.2 Overall application rates (kg/ha) of straight and compound nitrogen on tillage crops and grassland, Great Britain 1992 – 2013

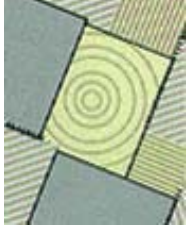


B2.1.1 Nitrogen use on major tillage crops

Overall application rates of total nitrogen on the main arable crops in Great Britain since 1983 are shown in Figure B2.3.

Figure B2.3 Overall application rates (kg/ha) of total nitrogen on major arable crops, Great Britain 1983 – 2013





B2.1.2 Autumn and winter applications of nitrogen fertiliser

The British Survey of Fertiliser Practice is able to monitor the extent to which recommended agronomic advice is adopted. By analysing the month during which fertiliser applications are made it is possible to assess the extent to which autumn and winter nitrogen is applied to winter cereals and oilseed rape. The standard advice is that autumn nitrogen is not required for winter cereals, as economic yield benefits are rare and autumn-applied nitrogen is vulnerable to leaching loss. The Great Britain values have remained below 10% of the crop area treated for both winter cereal crops since 2003, and despite some minor fluctuations the trend is for reduced dressing cover of autumn applied nitrogen on winter cereals. The area receiving autumn nitrogen is too low for data relating to average field application to be used. Autumn nitrogen at 30 kg/ha is recommended for winter oilseed rape, unless the soil has a high nitrogen fertility, as the crop normally requires more nitrogen than winter cereals during the autumn growth period.

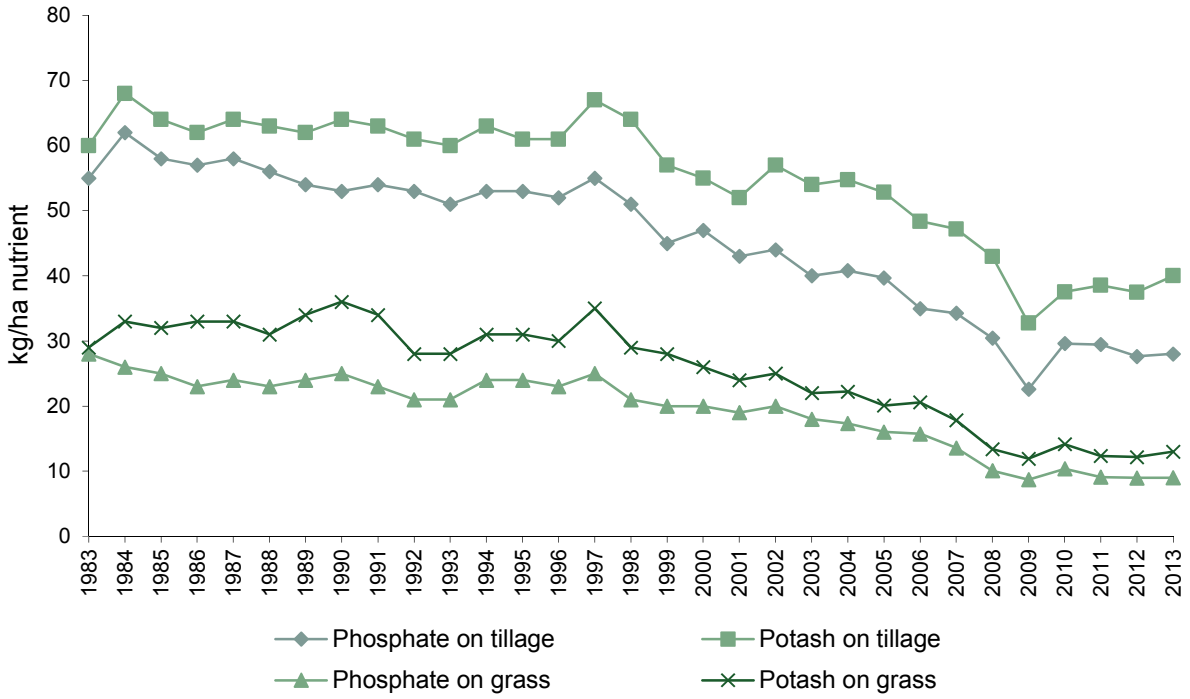
Table B2.2 Dressing cover (% area) of autumn or winter-applied (August to January) nitrogen on winter cereals and winter oilseed rape and average application rate (kg/ha) for winter oilseed rape, England & Wales 1984 – 1998 and Great Britain 1999 – 2012

	winter wheat	*winter barley*	*winter oilseed rape*	
	dressing cover	*dressing cover*	*dressing cover*	*application rate*
England & Wales				
1984	66	77	-	-
1985	56	64	88	52
1986	44	50	81	52
1987	36	43	74	53
1988	28	31	64	45
1989	18	25	52	45
1990	10	16	45	42
1991	11	12	49	46
1992	8	10	50	44
1993	8	8	41	42
1994	12	16	44	39
1995	11	13	48	38
1996	11	12	51	37
1997	12	11	44	36
1998	7	12	34	38
Great Britain				
1999	6	10	35	43
2000	7	11	33	42
2001	7	14	43	43
2002	8	16	41	47
2003	5	9	42	39
2004	6	9	35	40
2005	4	9	42	40
2006	5	7	28	34
2007	3	5	27	41
2008	3	6	31	33
2009	2	3	26	31
2010	2	7	29	33
2011	2	3	35	29
2012	2	5	31	27
2013	2	4	32	28

B2.2 PHOSPHATE AND POTASH USE

Annual overall rates of phosphate and potash on tillage crops and on grassland in Great Britain since 1983 are illustrated in Figure B2.4, using the data presented in Tables B2.3 and B2.4.

Figure B2.4 Overall application rates (kg/ha) phosphate and potash on tillage crops and grassland, Great Britain 1983 – 2013

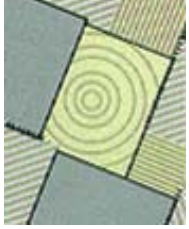


Overall phosphate use on tillage crops declined gradually between 1984 and 1996, from 62 kg/ha to 52 kg/ha. Thereafter the decline in rates became more marked to an overall rate of 28 kg/ha in 2013. This is the second lowest rate since Great Britain records began. The dip in use in 2009 was caused by a major price increase for the nutrient. It is of note that in Scotland the phosphate application rates on tillage land have largely been maintained, relative to the decline seen in England and Wales. Overall phosphate rates on tillage crops have been consistently higher than those recorded on grass.

The overall rate of phosphate on grassland was highest in 1983, at 28 kg/ha, and then application remained relatively stable at 21-26 kg/ha between 1984 and 1998. Overall application rates have declined more rapidly in the period between 1999 and 2013, where the rates were 20 kg/ha and 9 kg/ha respectively. The 2013 rate is the lowest since 1983.

Overall potash use on tillage crops declined slightly between 1983 and 1997, with the rates in the 60-68 kg/ha range. Like phosphate, overall application rates reduced at a greater rate after this time to 40 kg/ha in 2013. The potash rate in 2009 rate of 33 kg/ha was the lowest since 1983 and again was thought to be a reaction to the price of the nutrient. Again, as for phosphate the application of potash on tillage crops in Scotland has been largely maintained in contrast to the decline seen in England and Wales.

The pattern of overall potash use on grassland has been more variable, compared to tillage crops, but has also shown a net decline between 1983 and 2013. Overall potash rates were relatively stable at 31-33 kg/ha during the mid-late 1980s but, since then, have tended to decline despite temporary recorded increases.



Overall rates of phosphate and potash applied to tillage crops are more than three times those used on grassland. However there is greater use of applied manures on grassland (37% cover) than on tillage crops (23% cover) and grazed grassland also receives manure as it is grazed.

Table B2.3 Overall phosphate application rates (kg/ha), England & Wales 1969 - 2013 and Scotland and Great Britain 1983 – 2013

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1969	53	-	-	34	-	-	-	-	-
1970	56	-	-	32	-	-	-	-	-
1971	54	-	-	34	-	-	-	-	-
1972	56	-	-	34	-	-	-	-	-
1973	54	-	-	34	-	-	-	-	-
1974	51	-	-	27	-	-	39	-	-
1975	46	-	-	27	-	-	34	-	-
1976	50	-	-	29	-	-	38	-	-
1977	51	-	-	26	-	-	37	-	-
1978	49	-	-	28	-	-	39	-	-
1979	49	-	-	27	-	-	38	-	-
1980	49	-	-	27	-	-	37	-	-
1981	51	-	-	25	-	-	38	-	-
1982	55	-	-	24	-	-	39	-	-
1983	54	63	55	26	36	28	39	47	40
1984	61	68	62	25	33	26	42	48	42
1985	56	70	58	24	30	25	40	46	41
1986	56	63	57	22	27	23	40	42	40
1987	56	71	58	23	28	24	39	45	40
1988	54	65	56	21	31	23	38	45	39
1989	52	67	54	23	31	24	38	45	39
1990	51	68	53	24	28	25	38	43	39
1991	53	65	54	23	24	23	38	40	38
1992	51	67	54	19	30	22	35	43	38
1993	49	65	52	19	28	21	33	41	35
1994	51	69	53	23	28	24	37	43	38
1995	50	68	53	22	31	24	36	45	37
1996	51	65	52	22	26	23	36	40	36
1997	53	69	55	24	32	25	38	46	39
1998	49	66	51	20	27	21	34	43	35
1999	43	64	45	19	27	20	31	42	32
2000	44	60	47	18	30	20	31	42	32
2001	40	60	43	16	29	19	27	41	29
2002	41	62	44	18	26	20	29	39	31
2003	37	61	40	16	26	18	26	39	28
2004	38	63	41	15	27	17	25	40	28
2005	37	56	40	15	22	16	25	35	27
2006	32	53	35	14	22	16	23	33	25
2007	32	53	34	12	19	14	22	32	23
2008	28	50	30	9	16	10	18	28	20
2009	19	49	23	7	15	9	13	27	15
2010	27	50	30	9	16	10	18	27	19
2011	27	50	29	8	14	9	17	25	19
2012	25	50	28	8	14	9	16	25	17
2013	25	51	28	8	14	9	16	27	18

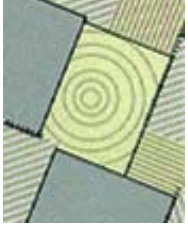
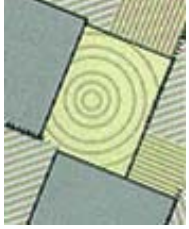


Table B2.4 Overall potash application rates (kg/ha), England & Wales 1969 - 2013 and Scotland and Great Britain 1983 – 2013

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
1969	61	-	-	23	-	-	-	-	-
1970	61	-	-	26	-	-	-	-	-
1971	59	-	-	21	-	-	-	-	-
1972	63	-	-	20	-	-	-	-	-
1973	60	-	-	22	-	-	-	-	-
1974	56	-	-	20	-	-	36	-	-
1975	51	-	-	21	-	-	34	-	-
1976	56	-	-	23	-	-	37	-	-
1977	56	-	-	23	-	-	39	-	-
1978	56	-	-	25	-	-	41	-	-
1979	53	-	-	27	-	-	40	-	-
1980	54	-	-	26	-	-	40	-	-
1981	56	-	-	26	-	-	41	-	-
1982	61	-	-	28	-	-	44	-	-
1983	60	62	60	28	36	29	44	46	43
1984	68	67	68	33	35	33	50	49	49
1985	63	67	64	32	34	32	48	47	48
1986	62	61	62	33	30	33	48	43	47
1987	63	70	64	33	31	33	48	47	48
1988	63	66	63	30	34	31	47	47	47
1989	60	73	62	34	36	34	48	51	48
1990	62	74	64	36	35	36	49	50	49
1991	62	72	63	35	31	34	49	47	49
1992	59	72	63	26	34	28	43	48	45
1993	58	72	60	27	34	29	42	47	43
1994	62	74	63	31	31	31	46	46	46
1995	59	72	61	30	34	31	44	48	45
1996	59	73	61	31	28	30	45	44	44
1997	66	74	67	35	36	35	50	50	50
1998	63	73	64	28	36	29	45	51	46
1999	55	71	57	27	32	28	41	48	42
2000	54	67	55	24	33	26	39	47	40
2001	48	72	52	23	33	24	34	49	37
2002	55	72	57	24	30	25	38	46	40
2003	51	73	54	20	31	22	34	46	36
2004	52	72	55	21	30	22	35	46	37
2005	51	65	53	19	26	20	34	40	35
2006	46	68	48	19	28	21	32	42	33
2007	44	69	47	17	23	18	30	40	32
2008	40	67	43	12	20	13	26	37	27
2009	29	64	33	10	20	12	19	35	22
2010	33	67	38	13	19	14	23	35	25
2011	35	65	39	11	16	12	23	32	25
2012	34	68	37	11	17	12	22	33	23
2013	36	68	40	11	19	13	22	36	25



Dressing covers of phosphate and potash on tillage and grass for the period 2004-13 are presented in Tables B2.5a and B2.5b. On tillage crops the phosphate dressing cover has declined in all countries since 2004. However the decline in England and Wales has been much higher (30% reduction) in comparison to Scotland where the reduction was 8% for the period. On grass, phosphate dressing covers have also declined, but at a similar rate in all three countries.

Potash dressing covers follow a similar pattern to phosphate, with a marked decline on tillage crops in England and Wales.

Table B2.5a Phosphate dressing covers (%), Great Britain 2004 – 2013

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
2004	61	93	65	55	77	59	58	83	61
2005	60	88	63	50	75	55	55	80	59
2006	52	89	57	52	75	56	52	79	57
2007	50	86	54	47	67	51	48	74	52
2008	46	88	52	37	61	42	42	71	47
2009	34	86	40	33	59	38	34	69	39
2010	45	87	50	37	64	43	41	71	46
2011	45	82	49	36	58	41	41	66	45
2012	42	87	47	37	57	41	39	67	44
2013	43	86	48	38	59	42	40	68	45

Table B2.5b Potash dressing covers (%), Great Britain 2004 – 2013

	tillage crops			*grass*			*all crops and grass*		
	England & Wales	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*	*England & Wales*	*Scotland*	*Great Britain*
2004	63	93	67	56	75	59	59	82	63
2005	61	90	65	51	71	55	56	78	60
2006	56	91	60	52	71	56	54	78	58
2007	54	90	58	47	65	51	51	74	54
2008	50	90	55	38	61	42	44	71	48
2009	37	88	43	34	61	39	35	71	41
2010	44	89	50	39	63	44	42	72	47
2011	46	84	50	38	57	42	42	66	46
2012	42	90	47	38	58	42	40	68	44
2013	46	87	51	39	59	43	42	69	47

B2.2.1 Phosphate and potash use on major tillage crops

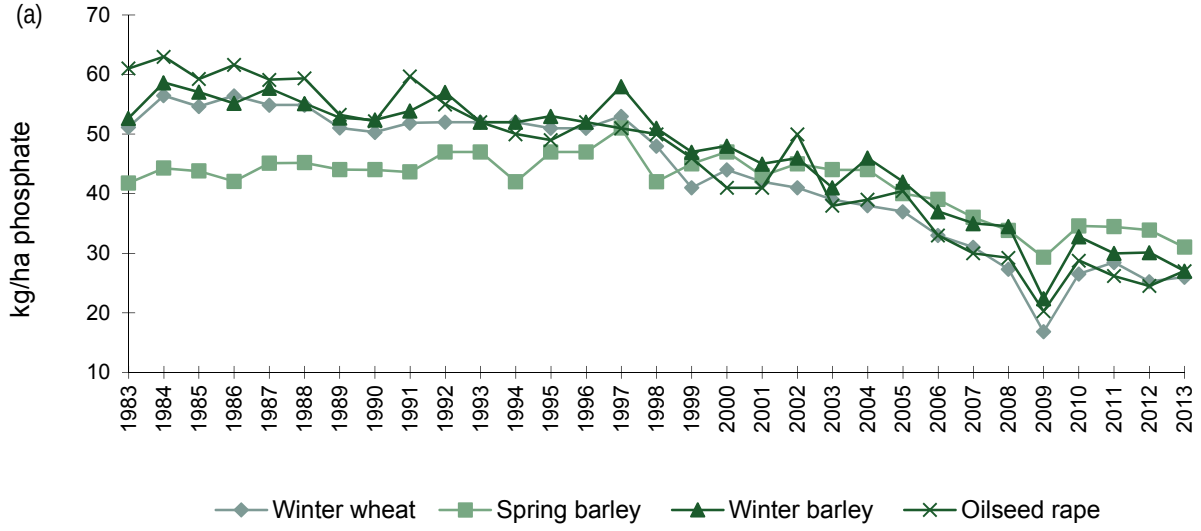
Overall application rates of phosphate and potash on the main arable crops in Great Britain since 1983 are shown in Figure B2.5.

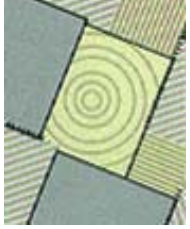
Phosphate use on most major tillage crops has shown a gradual net decline over the survey period. The net decline of phosphate on potatoes has been more dramatic, with a rate of 121 kg/ha reported in 2013, compared to 219 kg/ha in 1984. Overall application rates of phosphate have gradually declined on winter wheat and, less consistently, on winter barley since the mid 1980s (Figure B2.5(a)). By 1999 the overall phosphate rate had fallen below 50 kg/ha for both crops. From 2000 to 2007 rates were fairly stable in the 31-44 kg/ha range for winter wheat and 35-48 kg/ha for winter barley. 2009 saw more marked decreases in overall rates (-10 kg/ha for winter wheat and -13 kg/ha for winter barley). In 2010 overall phosphate rates recovered and have stabilised since then. Phosphate use on spring barley was stable between 1983 and 2004 in the range of 42-51 kg/ha. In 2005 the overall rate was 40 kg/ha, which had declined to 31 kg/ha by 2013.

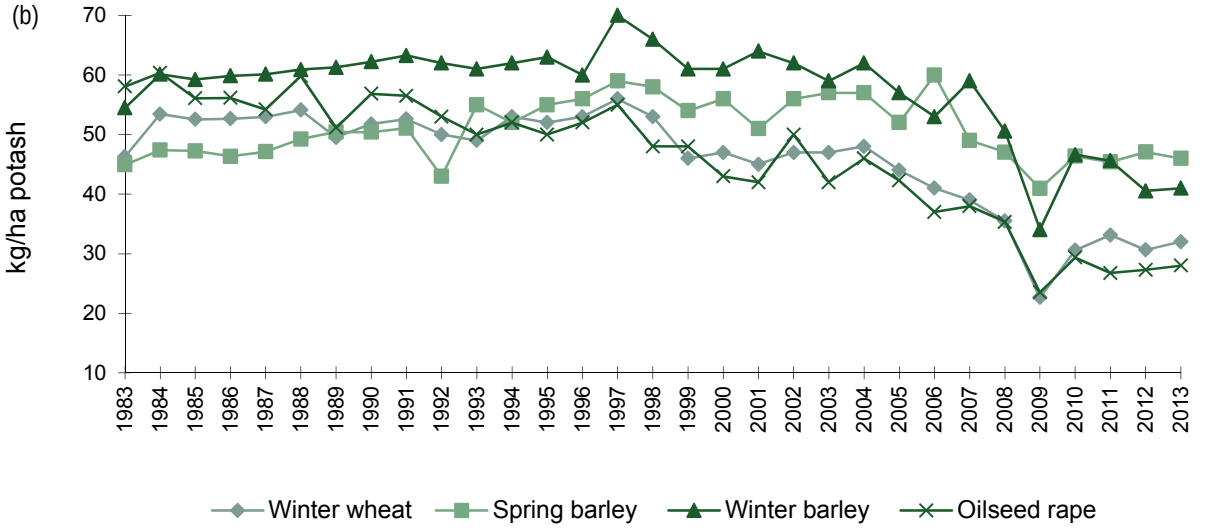
Overall phosphate use has also declined steadily on oilseed rape and sugar beet. Like other crops, the phosphate overall rate dipped in 2009, and as yet has not regained the rates reported in 2008, which were 29 kg/ha for oilseed rape and 31 kg/ha for sugar beet.

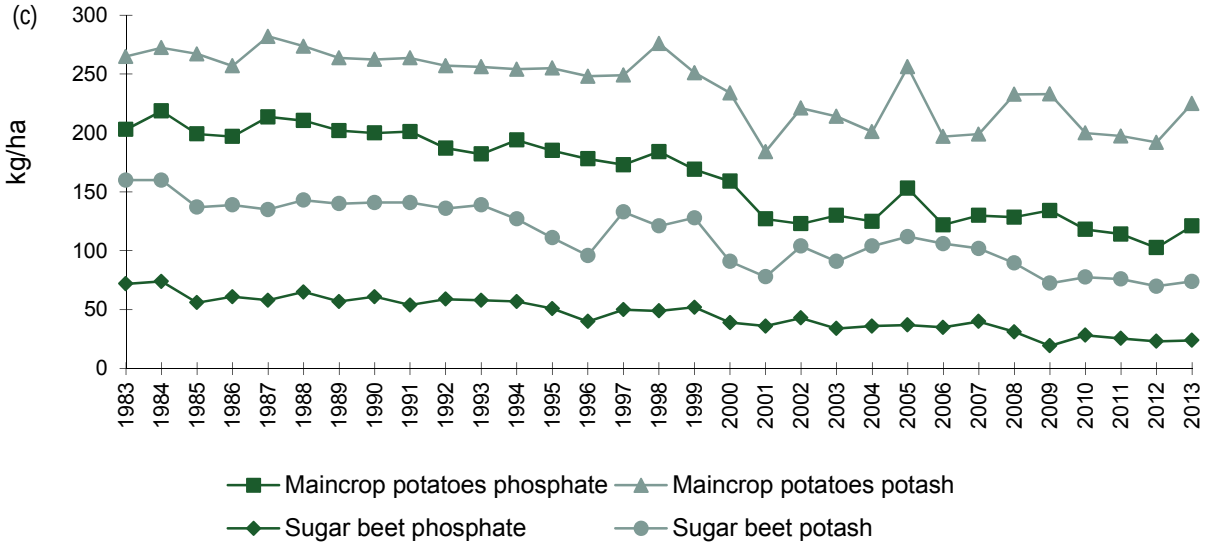
On winter wheat, the overall potash rates were fairly consistent between 1983 and 2005, in the range 44-56 kg/ha. Thereafter the rate declined, with a 2009 dip to 23 kg/ha, with modest recoveries since that point. For barley the rates were in the range of 49-61 kg/ha between 1983 and 2008. The rates in 2009 were 41 kg/ha for spring barley and 34 kg/ha for winter barley. In the years since 2009 the overall potash rates have been in the range 41-47 kg/ha. Overall potash rates have fluctuated more on oilseed rape, sugar beet and on potatoes than on the cereal crops. They do follow the general pattern of a dip in rates in 2009, and subsequent modest recoveries.

Figure B2.5 Overall application rates (kg/ha) of (a) phosphate and (b) potash on major arable crops, and (c) phosphate and potash on sugar beet and potatoes Great Britain 1983 – 2013





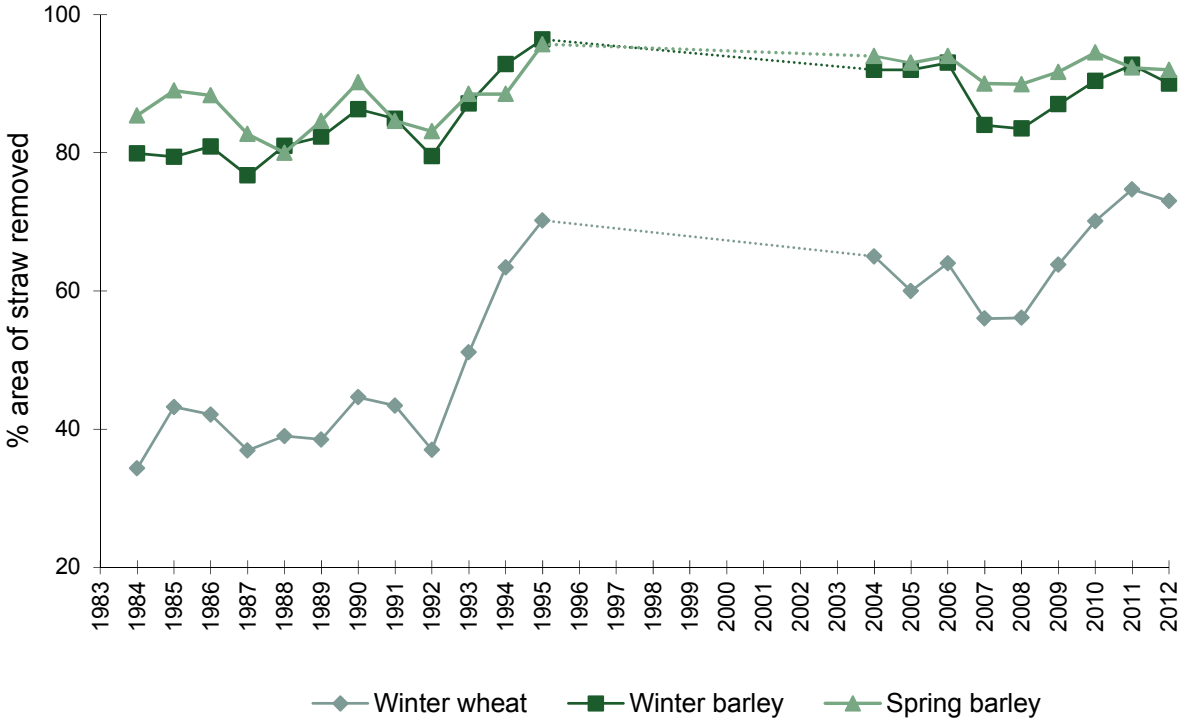

(b)
kg/ha potash
70
60
50
40
30
20
10
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Winter wheat
Spring barley
Winter barley
Oilseed rape


(c)
kg/ha
300
250
200
150
100
50
0
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Maincrop potatoes phosphate
Maincrop potatoes potash
Sugar beet phosphate
Sugar beet potash

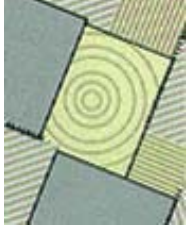
B2.4 STRAW REMOVAL

Estimates of the percentage of straw removed from wheat and barley fields are shown in Figure B2.6. Wheat and barley straw contains a significant quantity of nutrients, especially potassium. The removal of straw from the field after harvest also removes these nutrients, which would otherwise be returned to the soil when the straw is incorporated. These straws contain on average 1.2-1.5 kg P_2O_5 (phosphate) per tonne, and 9.5-12.5 kg K_2O (potash) per tonne, and it is estimated that for every tonne of cereal grain harvested 0.5 tonnes of straw can be baled and removed from the field. Thus the removal of wheat or barley straw will increase the removal of phosphate by about 10% more than if the grain alone were removed, while the amount of potash removed would be approximately doubled. Data collected as part of the 2013 survey will relate to the fate of the straw from the 2012 harvest so is reported against 2012. In 2012 73% of the winter wheat straw was removed from the fields, with the percentages for winter and spring barley much higher at 90 and 92% respectively.

Figure B2.6 Percentage of straw removed from wheat and barley fields, England and Wales harvest years 1985 – 1995, Great Britain harvest years 2004 - 2012



Data for the period 1984-95 were sourced from MAFF/Defra straw disposal surveys, those for the period 2004-12 from this survey. No data are available for the period 1996-03. The straw burning ban was introduced in 1993. This resulted in a significant increase in the percentage of straw removed, up to 70% and 96% for wheat and barley respectively, for the 1995 harvest.



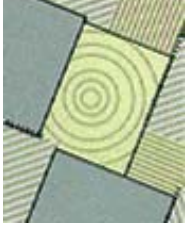
B2.4 TOTAL QUANTITIES OF NITROGEN PHOSPHATE AND POTASH, UK

Quantities of nitrogen, phosphate and potash used in the UK since 1965 are shown in Table B2.6. These data are based on BSFP findings and trade and sales data. They are compiled by the Agricultural Industries Confederation in conjunction with Defra using the methodology described in Section A2.5. They are considered to be the official figures for fertiliser usage.

Table B2.6 Quantities of major nutrients used, United Kingdom 1965-2012

	Nitrogen kt N				*Phosphate kt P_2O_5*				*Potash kt K_2O*			
	England & Wales	*Scotland*	*N. Ireland*	*UK*	*England & Wales*	*Scotland*	*N. Ireland*	*UK*	*England & Wales*	*Scotland*	*N. Ireland*	*UK*
1965	473	72	20	565	369	88	23	479	346	62	17	425
1966	491	76	23	590	332	81	22	435	335	61	18	413
1967	573	85	27	685	359	79	23	460	354	61	19	434
1968	625	93	29	748	367	81	21	469	362	62	18	441
1969	639	108	35	781	362	84	22	467	363	65	19	447
1970	653	108	34	796	366	81	23	470	356	63	20	438
1971	732	119	43	894	397	84	24	504	373	65	21	459
1972	751	120	48	919	371	76	24	470	336	60	19	416
1973	759	132	56	947	373	85	25	482	333	63	21	417
1974	784	139	57	980	357	72	21	449	347	55	19	421
1975	788	143	54	984	306	69	18	393	302	59	16	377
1976	851	144	65	1059	315	69	19	404	322	59	17	398
1977	879	146	68	1093	316	69	21	406	330	59	20	409
1978	924	156	75	1155	316	72	22	410	328	64	20	412
1979	941	160	85	1186	321	73	22	416	333	65	21	419
1980	1031	156	81	1268	342	75	24	440	361	65	22	447
1981	1100	159	76	1335	344	73	24	441	367	66	21	454
1982	1180	160	76	1416	357	65	24	446	394	67	22	483
1983	1227	161	82	1470	359	65	24	448	409	68	23	500
1984	1316	183	89	1588	391	69	28	488	457	73	29	559
1985	1298	186	96	1580	375	71	23	469	441	72	28	541
1986	1297	176	99	1572	341	65	28	434	415	66	29	510
1987	1370	193	111	1674	340	65	27	432	429	70	29	528
1988	1251	180	94	1525	341	70	24	435	419	76	29	524
1989	1223	193	98	1514	334	65	26	425	420	74	29	523
1990	1275	194	113	1582	323	63	28	414	409	73	33	515
1991	1224	193	98	1515	321	61	24	406	393	71	28	492
1992	1105	166	94	1365	295	55	21	371	351	64	26	441
1993	968	142	109	1219	286	50	24	360	344	57	29	430
1994	986	133	129	1248	312	51	28	391	361	59	38	458
1995	1064	156	128	1348	325	53	27	405	378	64	34	476
1996	1048	157	128	1333	302	62	30	394	370	65	36	471
1997	1156	172	112	1440	325	63	24	412	405	65	31	501
1998	1111	158	106	1375	308	56	19	383	397	64	26	487
1999	1015	152	117	1284	274	50	23	347	365	59	27	451
2000	1005	150	113	1268	237	59	21	317	322	61	26	409
2001	876	180	106	1162	201	57	21	279	274	69	26	369
2002	915	187	95	1197	209	55	19	283	397	70	24	391
2003	853	170	108	1131	203	60	19	282	283	66	26	375
2004	875	150	100	1125	205	57	16	278	288	65	22	375
2005	834	150	77	1061	192	55	12	259	267	67	18	352
2006	780	153	70	1003	173	51	11	235	243	66	16	325
2007	802	126	80	1008	169	46	9	224	241	59	17	317
2008	800	127	74	1001	160	49	6	215	244	68	13	325
2009	767	124	57	948	91	34	4	129	148	52	8	208
2010	813	127	76	1016	134	44	6	184	182	57	12	251
2011	824	124	74	1022	145	42	5	192	213	59	11	283
2012	809	125	66	1000	140	43	5	188	193	56	10	259
2013e	*778*	*138*	*79*	*995*	*141*	*46*	*7*	*194*	*194*	*60*	*13*	*267*

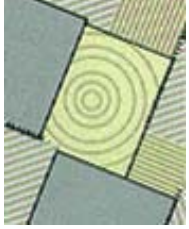
Note: Years are harvest (e.g. 2013 refers to the 2012/13 cropping year) rather than calendar years. Data for 2013 are estimates.



Total nitrogen use in the UK increased from 565 thousand tonnes in 1965 up to 1674 thousand tonnes in 1987 before declining gradually to 1061 thousand tonnes in 2005. Between 2006 and 2013 nitrogen use has remained relatively stable. The drop in 2009 was related to high fertiliser prices. From the peak in 1987, nitrogen use since 2010 has fallen by approximately 40%.

Phosphate use in the UK has fallen since the mid 1980s but since 2007 this decline has slowed and total phosphate use has been more stable between 2010 and 2013 at 184-194 thousand tonnes, but use is still approximately half that compared to use between 1965 and 1985. The low use of 129 thousand tonnes in 2009 was price related.

Potash use in the UK was highest in the mid 1980s through to 1999 after which there has been a more sustained decline. Potash use between 2010 and 2013 has been between 259-283 thousand tonnes, which is around half that used at its peak. The low use of 208 thousand tonnes in 2009 was price related.



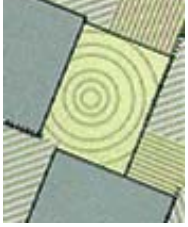
SECTION C – TABLES

CONTENTS

GREAT BRITAIN TABLES 2013

ENGLAND AND WALES TABLES 2013

Note: 1. Row percentages may not sum to exactly to 100 due to rounding.
2. No estimates are shown for crops with fewer than 5 fields in the sample. Nevertheless, some estimates are based on very few fields in the sample and should be treated with great caution.
3. FYM refers to any form of organic manure applied.



SCOTLAND TABLES 2013

Note: 1. Row percentages may not sum to exactly to 100 due to rounding.
2. No estimates are shown for crops with fewer than 5 fields in the sample. Nevertheless, some estimates are based on very few fields in the sample and should be treated with great caution.
3. FYM refers to any form of organic manure applied.

Table GB1.1 Total fertiliser use, Great Britain 2013

	Crop area receiving dressing (%)					Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	SO_3	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	93	30	35	44	22	140	73	66	129	22	23	157
Winter wheat	99	43	43	53	17	186	62	74	183	26	32	1208
Spring barley	98	63	68	43	26	110	50	67	108	31	46	879
Winter barley	98	49	57	50	19	145	55	73	142	27	41	374
Oats	92	51	53	39	20	107	59	76	99	30	40	242
Rye/triticale/Durum wheat	35	16	16	21	8	128	-	-	45	-	-	9
Potatoes (seed or earlies)	91	74	61	26	12	108	110	196	98	82	119	20
Potatoes (maincrop)	97	84	88	26	51	179	143	255	173	121	225	87
Sugar beet	99	40	67	44	56	96	61	110	94	24	74	117
Spring oilseed rape	100	42	47	63	11	121	58	64	121	24	30	85
Winter oilseed rape	99	45	40	73	18	188	60	69	187	27	28	450
Linseed	94	24	25	32	12	88	72	67	83	17	17	46
Forage maize	83	53	43	24	77	68	49	67	56	26	28	190
Rootcrops for stockfeed	82	68	68	15	49	88	62	78	72	43	54	70
Leafy forage crops	78	47	51	12	52	78	37	46	61	17	23	52
Arable silage/other fodder crops	57	50	53	7	39	75	30	51	43	15	27	74
Peas - human consumption	0	33	40	11	0	-	63	78	-	20	31	36
Peas - animal consumption	3	36	46	7	0	-	52	65	-	19	30	25
Beans - animal consumption	2	27	29	4	4	-	62	65	-	17	19	134
Vegetables (brassicae)	88	54	88	12	15	146	85	115	129	46	101	19
Vegetables (other)	65	62	81	25	6	125	75	132	81	46	107	52
Soft Fruit	98	57	86	23	0	63	73	133	61	42	115	22
Top Fruit	94	36	61	20	4	64	21	73	60	8	45	33
Other tillage	32	30	29	2	14	58	34	53	18	10	16	47
All tillage	92	48	51	47	23	148	59	78	136	28	40	4428
Grass under 5 years old	79	53	57	15	47	123	30	45	98	16	26	1003
Grass 5 years and over	58	40	40	6	35	89	20	25	52	8	10	2375
All grass	62	42	43	8	37	96	22	29	59	9	13	3378
All crops and grass	75	45	47	25	31	125	40	53	94	18	25	7806

Source: British Survey of Fertiliser Practice 2013

Table GB1.2 Use of straight fertiliser, Great Britain 2013

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	89	8	13	132	119	77	118	9	10	157
Winter wheat	97	12	14	182	75	83	177	9	11	1208
Spring barley	81	5	12	95	63	78	77	3	9	879
Winter barley	94	5	12	139	78	81	130	4	10	374
Oats	81	8	11	101	57	103	82	5	12	242
Rye/triticale/Durum wheat	35	0	0	128	-	-	45	-	-	9
Potatoes (seed or earlies)	63	0	37	71	-	188	45	-	70	20
Potatoes (maincrop)	57	9	24	99	158	198	56	14	47	87
Sugar beet	94	3	31	93	62	124	87	2	38	117
Spring oilseed rape	100	11	20	114	83	74	114	9	15	85
Winter oilseed rape	99	10	13	180	69	81	179	7	10	450
Linseed	94	14	14	85	85	61	80	12	8	46
Forage maize	45	3	13	78	68	113	35	2	14	190
Rootcrops for stockfeed	28	0	10	110	-	98	31	-	10	70
Leafy forage crops	42	0	0	79	-	-	33	-	-	52
Arable silage/other fodder crops	22	3	4	81	-	-	18	-	-	74
Peas - human consumption	0	17	24	-	71	84	-	12	20	36
Peas - animal consumption	3	12	22	-	-	75	-	-	17	25
Beans - animal consumption	0	12	13	-	52	63	-	6	8	134
Vegetables (brassicae)	31	9	17	97	-	-	31	-	-	19
Vegetables (other)	48	17	38	108	56	84	52	10	32	52
Soft Fruit	98	57	86	63	73	133	61	42	115	22
Top Fruit	75	4	28	54	61	57	41	2	16	33
Other tillage	9	2	3	82	-	-	8	-	-	47
All tillage	83	9	14	145	74	89	121	6	13	4428
Grass under 5 years old	41	2	3	117	67	90	48	1	3	1003
Grass 5 years and over	26	1	0	94	56	79	24	0	0	2375
All grass	28	1	1	100	60	85	28	1	1	3378
All crops and grass	53	4	7	131	72	89	69	3	6	7806

Source: British Survey of Fertiliser Practice 2013

Table GB1.3 Use of compound fertiliser, Great Britain 2013

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	15	22	22	77	56	59	11	13	13	157
Winter wheat	11	31	30	61	55	68	7	17	21	1208
Spring barley	48	58	58	64	48	63	31	28	37	879
Winter barley	18	44	45	67	52	70	12	23	32	374
Oats	20	43	41	80	59	69	16	25	28	242
Rye/triticale/Durum wheat	0	16	16	-	-	-	-	-	-	9
Potatoes (seed or earlies)	58	74	42	93	110	116	53	82	49	20
Potatoes (maincrop)	78	79	77	149	135	229	116	106	178	87
Sugar beet	16	37	45	48	61	80	7	23	36	117
Spring oilseed rape	18	31	26	35	49	57	6	15	15	85
Winter oilseed rape	21	35	28	37	56	63	8	20	17	450
Linseed	4	10	12	-	55	75	-	6	9	46
Forage maize	50	51	30	42	48	47	21	24	14	190
Rootcrops for stockfeed	68	68	63	61	62	70	42	43	44	70
Leafy forage crops	46	47	51	61	37	46	28	17	23	52
Arable silage/other fodder crops	44	47	49	58	29	47	25	14	23	74
Peas - human consumption	0	16	16	-	54	69	-	9	11	36
Peas - animal consumption	0	24	24	-	48	57	-	11	13	25
Beans - animal consumption	2	16	16	-	66	63	-	11	10	134
Vegetables (brassicae)	88	54	80	111	61	92	98	33	73	19
Vegetables (other)	39	44	43	75	82	175	29	36	75	52
Soft Fruit	0	0	0	-	-	-	-	-	-	22
Top Fruit	42	34	42	45	15	69	19	5	28	33
Other tillage	23	28	26	45	34	51	11	10	13	47
All tillage	25	40	38	64	55	71	16	22	27	4428
Grass under 5 years old	54	51	55	92	28	42	50	15	23	1003
Grass 5 years and over	40	40	40	69	19	24	27	8	10	2375
All grass	42	42	42	74	21	28	31	9	12	3378
All crops and grass	34	41	40	70	36	46	24	15	19	7806

Source: British Survey of Fertiliser Practice 2013

Table GB1.4 Use of lime, Great Britain 2013

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	2.4	0.2	0.8	-	-	3.3	3.7	2.6	5.0	-	-	4.0	13	157
Winter wheat	2.7	0.8	0.8	-	0.0	4.3	4.4	6.0	4.5	-	2.5	4.7	52	1208
Spring barley	5.9	0.4	1.1	0.3	3.1	10.9	4.0	4.9	5.0	2.5	0.5	3.1	95	879
Winter barley	2.3	0.5	0.9	-	0.7	4.5	3.2	5.0	6.8	-	0.8	3.8	20	374
Oats	4.7	1.2	-	-	0.4	6.2	3.1	11.6	-	-	1.7	4.6	19	242
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	9
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	20
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	0	87
Sugar beet	5.1	7.7	0.5	16.8	1.0	31.2	6.2	3.2	5.0	6.0	5.0	5.3	33	117
Spring oilseed rape	1.5	2.2	-	-	0.6	4.3	4.1	5.0	-	-	2.5	4.4	5	85
Winter oilseed rape	6.3	0.8	0.7	0.6	-	8.4	4.2	7.1	5.0	6.1	-	4.7	40	450
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	0	46
Forage maize	5.4	0.9	0.3	-	0.1	6.7	3.7	4.1	4.4	-	5.0	3.8	18	190
Rootcrops for stockfeed	14.2	-	6.8	0.4	1.3	22.6	5.2	-	4.1	5.0	0.5	4.6	15	70
Leafy forage crops	7.8	1.2	1.8	-	6.3	17.0	4.6	3.4	5.9	-	1.9	3.7	11	52
Arable silage/other fodder crops	18.0	0.6	0.3	-	2.8	21.7	4.2	3.4	5.0	-	1.6	3.8	15	74
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	3	36
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	25
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	4	134
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	4	19
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	2	52
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	2	22
Top Fruit	-	-	-	-	25.6	25.6	-	-	-	-	0.4	0.4	6	33
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	47
All tillage	4.3	0.9	0.7	0.5	1.0	7.4	4.2	5.4	4.9	5.6	0.7	4.0	360	4428
Grass under 5 years old	4.2	0.1	0.5	-	0.8	5.6	4.3	4.8	5.1	-	1.2	3.9	86	1003
Grass 5 years and over	1.6	0.0	0.5	-	0.3	2.4	4.1	3.1	3.1	-	1.0	3.5	91	2375
All grass	2.0	0.0	0.5	-	0.4	3.0	4.1	3.6	3.4	-	1.1	3.6	177	3378
All crops and grass	3.0	0.4	0.6	0.2	0.7	5.0	4.2	5.3	4.2	5.6	0.9	3.9	537	7806

Source: British Survey of Fertiliser Practice 2013

Table GB2.1 Average fertiliser practice by grassland utilisation, Great Britain 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed not mown	53	37	36	24	79	18	18	42	7	7	1519
Grazed mown	75	51	53	56	108	26	39	81	13	20	1343
All grazings	60	41	42	35	91	21	27	55	9	11	2862
Cut for silage - grazed	84	57	59	66	119	27	42	100	15	25	919
Cut for silage - not grazed	91	59	65	71	137	31	48	125	18	31	351
All cut for silage	86	57	61	67	124	28	44	106	16	27	1270
Cut for hay - grazed	57	37	38	36	73	21	27	42	8	10	455
Cut for hay - not grazed	60	42	43	30	91	27	40	55	12	17	123
All cut for hay	58	38	39	35	77	22	29	44	8	11	578
All mowings	77	52	55	58	114	27	41	88	14	22	1806
All grass	62	42	43	37	96	22	29	59	9	13	3378

Source: British Survey of Fertiliser Practice 2013

Table GB3.0 Product use by month of application, Great Britain 2013

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	7	20	39	23	7	3	1
Straight P	11	5	1	0	1	15	22	24	14	1	0	6
Straight K	4	5	5	2	1	18	27	22	12	2	0	2
Compounds	5	3	1	0	0	4	17	39	16	8	4	3
All fertilisers	2	2	1	0	0	6	19	38	20	7	3	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	0	0	0	0	5	19	40	22	8	3	1
Phosphate	9	5	1	0	0	8	19	35	13	3	2	4
Potash	6	4	2	0	0	9	21	35	13	5	2	3
Total	3	2	0	0	0	6	19	38	20	7	3	2

Note: All fertilisers includes other straight fertilisers (e.g. sulphur or trace elements)

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2013.

'Nutrient' refers to the tonnage of each nutrient contained in the products used.

(e.g. 100 kg of a 20:10:10 compound contains 20 kg of N, 10 kg of P_2O_5 and 10 kg of K_2O, while 100 kg of ammonium nitrate (straight N) contains typically 34.5 kg of N).

Estimates of total nutrients are shown in Section B, Table B2.5.

Source: British Survey of Fertiliser Practice 2013

Table GB3.1 Product type as percentage of all product used by crop group, Great Britain 2013

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not specified	all grass	all crops and grass
Ammonium Nitrate	39.1	52.4	11.1	21.3	50.7	21.2	43.1	30.3	33.6	28.3	23.9	30.4	39.7
Urea	3.8	7.1	0.7	2.3	9.3	2.1	5.7	2.4	2.7	2.2	0.0	2.3	4.8
Calcium Ammonium Nitrate (CAN)	1.9	1.1	0.0	0.6	1.1	2.2	1.3	1.8	2.7	1.6	0.0	1.9	1.5
Urea Ammonium Nitrate (UAN)	8.3	13.2	1.4	8.9	13.3	3.8	10.5	2.1	0.9	2.5	30.3	2.4	8.3
Other Straight N	2.4	1.9	1.9	2.8	3.9	3.0	2.5	0.9	1.4	1.0	0.0	0.9	2.0
Triple Superphosphate (TSP)	1.7	2.6	2.5	0.8	1.9	4.6	2.4	0.7	0.2	0.5	3.4	0.7	1.9
Other Straight P	0.0	0.1	1.3	0.1	0.1	0.7	0.2	0.1	0.0	0.1	0.0	0.1	0.2
Muriate of Potash (MOP)	3.2	2.8	9.6	1.0	2.3	6.0	3.3	0.3	0.6	0.6	3.7	0.5	2.6
Other Straight K	0.3	0.2	2.2	21.3	0.4	3.8	1.5	0.3	0.2	0.4	5.3	0.3	1.2
PK	8.5	10.8	3.8	31.6	7.5	10.7	10.2	1.5	3.3	2.3	10.0	2.3	8.1
NK	2.0	0.9	1.8	1.4	0.3	4.1	1.4	5.1	3.7	8.0	1.1	5.6	2.5
Low N (<19% N)	15.9	3.5	59.1	4.8	7.0	23.9	11.4	4.0	5.6	3.9	2.6	4.0	9.4
High N (>=19% N)	12.7	3.1	4.3	0.7	1.9	12.6	5.9	50.5	44.9	48.6	19.6	48.5	17.4
Other	0.2	0.2	0.4	2.5	0.3	1.4	0.4	0.0	0.0	0.1	0.0	0.1	0.3
Total product ('000 tonnes)	**621**	**1221**	**95**	**87**	**451**	**155**	**2630**	**1038**	**112**	**631**	**8**	**1261**	**3891**

Source: British Survey of Fertiliser Practice 2013

Table GB3.2 Use of product type by crop group, Great Britain 2013

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not specified	all grass	total product ('000 tonnes)
Ammonium Nitrate	20.3	54.1	1.0	1.7	20.0	2.9	75.0	80.6	9.3	46.9	0.3	25.0	1507
Urea	16.6	54.0	0.1	1.5	26.0	1.8	84.3	85.5	7.4	69.6	0.0	15.7	199
Calcium Ammonium Nitrate (CAN)	31.6	39.6	0.0	4.3	15.2	9.3	51.6	86.0	5.0	33.3	0.0	48.4	67
Urea Ammonium Nitrate (UAN)	16.3	59.9	0.3	2.0	19.4	2.1	92.4	77.2	5.2	63.0	13.3	7.6	362
Other Straight N	22.8	36.3	5.5	1.2	26.1	8.1	89.1	77.1	14.4	54.5	0.0	10.9	74
Triple Superphosphate (TSP)	17.9	50.1	3.0	0.5	16.6	11.9	88.6	90.5	0.8	35.8	2.0	11.4	73
Other Straight P	0.0	50.9	9.6	1.9	8.0	29.5	71.7	100.0	0.0	54.1	0.0	28.3	3
Muriate of Potash (MOP)	23.6	39.6	7.9	1.7	13.0	14.3	94.8	51.2	13.5	79.5	5.2	5.2	82
Other Straight K	7.9	11.3	3.2	55.2	8.0	14.5	92.3	74.5	1.8	59.3	18.9	7.7	43
PK	20.4	50.9	1.0	9.5	12.1	6.1	94.2	63.7	18.9	56.4	2.8	5.8	277
NK	43.5	25.2	4.2	5.5	2.2	19.5	36.8	66.6	6.2	85.4	0.1	63.2	115
Low N (<19% N)	39.8	14.1	21.7	0.7	9.7	14.0	86.8	72.9	17.2	55.1	0.2	13.2	309
High N (>=19% N)	55.2	20.7	5.0	0.5	7.3	11.3	16.6	86.2	8.7	46.6	0.2	83.4	766
Other	14.6	26.4	6.1	25.5	7.9	19.6	97.8	0.0	0.0	100.0	0.0	2.2	13
All Fertilisers	**23.6**	**46.4**	**3.6**	**3.3**	**17.1**	**5.9**	**67.6**	**82.3**	**8.9**	**50.0**	**0.6**	**32.4**	**3891**

Source: British Survey of Fertiliser Practice 2013

Table GB3.3 Product use by month of application, Great Britain 2013

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.0	5.7	19.0	38.4	23.7	8.3	2.9	1.3	0.5	0.1	0.0	0.0	1507
Urea	0.1	13.8	26.1	34.7	14.9	6.4	3.6	0.0	0.2	0.1	0.0	0.0	199
Calcium Ammonium Nitrate (CAN)	0.0	4.8	12.6	35.2	28.8	8.8	7.5	1.1	1.0	0.0	0.2	0.0	67
Urea Ammonium Nitrate (UAN)	0.0	8.0	20.1	40.4	24.7	5.2	0.3	0.5	0.4	0.4	0.0	0.0	362
Other Straight N	0.4	12.6	31.3	46.0	4.5	3.3	1.1	0.0	0.1	0.4	0.2	0.0	74
Triple Superphosphate (TSP)	1.2	14.2	21.7	24.7	14.9	1.0	0.0	5.8	10.8	4.7	0.7	0.2	73
Other Straight P	0.0	25.2	35.8	9.0	0.0	0.0	0.0	0.0	26.2	3.8	0.0	0.0	3
Muriate of Potash (MOP)	0.4	15.2	27.5	27.0	14.8	3.0	0.0	3.0	4.4	3.0	0.9	0.8	82
Other Straight K	2.8	23.1	26.0	11.7	7.3	0.0	1.4	0.0	1.8	8.3	12.2	5.4	43
PK	0.5	9.3	20.9	17.9	2.5	1.0	2.2	5.8	19.7	14.9	4.7	0.7	277
NK	0.0	2.4	14.1	30.8	16.0	21.2	9.7	5.5	0.1	0.2	0.0	0.0	115
Low N (<19% N)	0.0	6.3	17.7	51.0	13.2	2.6	0.2	3.2	4.2	1.2	0.2	0.0	309
High N (>=19% N)	0.0	1.7	16.2	42.4	22.0	9.7	5.1	2.4	0.5	0.0	0.0	0.0	766
Other	4.0	9.1	40.1	6.1	20.3	0.1	0.0	5.6	0.0	1.3	0.0	13.4	13
All Fertilisers	**0.1**	**6.5**	**19.3**	**37.7**	**19.6**	**7.2**	**3.0**	**2.1**	**2.4**	**1.5**	**0.5**	**0.2**	**3891**

Source: British Survey of Fertiliser Practice 2013

Table GB4.1 Average fertiliser practice on cereal farms, Great Britain 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	91	30	36	14	150	82	75	137	25	26	70
Winter wheat	100	46	45	14	192	62	73	191	29	33	556
Spring barley	99	64	71	17	114	54	66	113	35	47	286
Winter barley	100	57	63	13	151	60	74	151	34	47	122
Oats	98	50	52	15	111	57	76	108	29	40	99
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	1
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	3
Potatoes (maincrop)	100	79	100	62	175	162	273	175	128	273	11
Sugar beet	99	51	78	56	96	90	99	95	46	77	32
Spring oilseed rape	100	43	47	9	116	61	60	116	26	28	46
Winter oilseed rape	99	49	42	18	190	61	72	188	30	30	245
Linseed	96	26	21	14	100	64	77	96	17	16	29
Forage maize	100	64	54	33	98	54	67	98	34	36	19
Rootcrops for stockfeed	100	93	70	40	125	62	111	125	58	79	9
Leafy forage crops	-	-	-	-	-	-	-	-	-	-	3
Arable silage/other fodder crops	63	68	68	10	-	36	38	-	24	26	7
Peas - human consumption	0	10	3	0	-	-	-	-	-	-	9
Peas - animal consumption	4	41	45	0	-	49	63	-	20	28	19
Beans - animal consumption	1	28	32	2	-	59	58	-	17	19	71
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	2
Vegetables (other)	1	23	83	5	-	-	-	-	-	-	8
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	9	11	9	0	-	-	-	-	-	-	15
All tillage	92	49	50	15	160	61	73	148	30	37	1662
Grass under 5 years old	73	39	42	20	117	30	51	85	12	22	117
Grass 5 years and over	55	28	29	6	83	26	33	46	7	10	259
All grass	60	31	33	10	96	28	40	58	9	13	376
All crops and grass	87	46	48	14	154	57	69	134	27	33	2038

The data in this table apply to farms in the 'cereals' robust group, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2013

Table GB4.2 Average fertiliser practice on general cropping and horticultural farms, Great Britain 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	100	34	44	7	131	85	61	131	29	27	44
Winter wheat	100	40	44	8	184	67	82	183	27	36	340
Spring barley	99	62	70	13	114	49	78	113	30	55	195
Winter barley	100	47	56	14	143	56	78	143	26	44	89
Oats	100	71	74	14	114	73	91	114	51	68	42
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	2
Potatoes (seed or earlies)	94	73	55	15	97	113	161	91	82	88	15
Potatoes (maincrop)	95	85	88	46	178	138	250	170	117	219	59
Sugar beet	98	38	67	52	97	49	115	95	19	77	74
Spring oilseed rape	100	28	52	8	155	-	101	155	-	52	14
Winter oilseed rape	100	42	38	11	191	59	69	191	25	26	120
Linseed	100	0	27	0	63	-	-	63	-	-	11
Forage maize	55	35	30	56	79	44	66	43	16	19	25
Rootcrops for stockfeed	51	48	69	28	124	-	80	63	-	56	10
Leafy forage crops	100	23	60	21	102	-	-	102	-	-	5
Arable silage/other fodder crops	60	56	88	14	-	-	74	-	-	66	6
Peas - human consumption	0	44	50	0	-	66	86	-	29	44	23
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	4
Beans - animal consumption	5	38	35	7	-	72	87	-	27	30	32
Vegetables (brassicae)	75	75	75	33	192	114	153	144	85	114	9
Vegetables (other)	95	82	87	5	125	75	159	118	61	139	34
Soft Fruit	99	64	97	0	62	73	133	61	47	128	19
Top Fruit	97	43	70	4	61	21	75	59	9	53	28
Other tillage	56	49	52	0	61	32	50	34	16	26	23
All tillage	94	49	55	15	149	66	98	140	32	54	1223
Grass under 5 years old	76	41	46	20	106	31	41	80	13	19	85
Grass 5 years and over	48	17	19	15	94	21	31	45	3	6	176
All grass	53	21	24	16	97	24	34	51	5	8	261
All crops and grass	85	43	48	15	142	61	91	120	26	44	1484

The data in this table apply to farms in the 'general cropping' and 'horticulture' robust groups, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2013

Table GB4.3 Average fertiliser practice on dairy farms, Great Britain 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	77	22	11	70	152	38	52	117	8	6	15
Winter wheat	95	12	12	54	167	47	53	158	5	6	62
Spring barley	88	48	47	67	91	35	46	80	17	21	78
Winter barley	100	15	27	32	128	58	79	128	9	22	29
Oats	93	38	28	30	79	54	-	74	21	-	11
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	2
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	1
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	4
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	2
Winter oilseed rape	100	27	27	40	186	-	-	186	-	-	8
Linseed	-	-	-	-	-	-	-	-	-	-	1
Forage maize	85	60	37	91	60	54	58	51	33	22	86
Rootcrops for stockfeed	85	52	52	85	47	31	40	40	16	21	8
Leafy forage crops	56	64	64	53	51	40	45	29	26	29	11
Arable silage/other fodder crops	51	40	45	68	81	25	27	41	10	12	32
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	0	0	0	10	-	-	-	-	-	-	7
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	3
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	4
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	3
All tillage	84	41	34	67	102	47	54	86	19	19	367
Grass under 5 years old	87	45	57	74	165	32	54	144	14	31	237
Grass 5 years and over	82	44	47	68	132	23	34	109	10	16	426
All grass	83	45	49	69	141	26	40	118	11	20	663
All crops and grass	84	44	46	69	134	29	42	112	13	19	1030

The data in this table apply to farms in the 'dairy' robust group, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2013

Table GB4.4 Average fertiliser practice on other livestock farms, Great Britain 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	-	-	-	-	-	-	-	-	-	-	4
Winter wheat	94	57	55	48	151	47	49	143	27	27	42
Spring barley	95	75	71	60	95	40	54	90	30	39	122
Winter barley	93	73	79	31	143	51	62	133	37	49	40
Oats	75	55	55	43	87	49	55	65	27	30	35
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	2
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	0
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	2
Sugar beet	-	-	-	-	-	-	-	-	-	-	0
Spring oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	4
Linseed	-	-	-	-	-	-	-	-	-	-	0
Forage maize	70	55	42	94	42	44	49	29	24	21	27
Rootcrops for stockfeed	83	76	75	53	69	65	64	57	50	48	29
Leafy forage crops	88	55	55	67	72	35	39	63	19	22	26
Arable silage/other fodder crops	74	80	74	39	71	33	76	52	27	57	18
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	0
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	0
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	1
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	0
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	1
Soft Fruit	-	-	-	-	-	-	-	-	-	-	0
Top Fruit	-	-	-	-	-	-	-	-	-	-	0
Other tillage	-	-	-	-	-	-	-	-	-	-	1
All tillage	88	68	65	55	102	45	56	90	30	36	358
Grass under 5 years old	80	69	68	50	91	28	36	73	19	25	374
Grass 5 years and over	54	43	42	34	73	18	22	39	8	9	1233
All grass	56	46	45	36	76	20	24	43	9	11	1607
All crops and grass	58	47	46	37	78	22	26	45	10	12	1965

The data in this table apply to farms in the 'LFA grazing livestock' and 'lowland grazing livestock' robust groups, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2013

Table GB4.5 Average fertiliser practice on mixed farms, Great Britain 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	84	53	60	17	127	32	46	106	17	27	20
Winter wheat	94	42	45	34	179	53	66	169	22	30	187
Spring barley	99	65	69	39	107	45	64	106	29	44	184
Winter barley	94	44	52	29	136	46	68	128	20	35	86
Oats	81	35	36	26	99	49	67	80	17	24	54
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	2
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	1
Potatoes (maincrop)	100	75	81	77	192	188	307	192	141	248	10
Sugar beet	100	26	53	79	88	-	103	88	-	54	8
Spring oilseed rape	100	52	46	14	121	49	52	121	26	24	18
Winter oilseed rape	100	36	37	27	172	53	55	172	19	20	60
Linseed	69	62	62	25	-	-	-	-	-	-	5
Forage maize	94	36	60	79	69	31	90	65	11	54	33
Rootcrops for stockfeed	94	39	54	42	98	91	121	93	35	65	13
Leafy forage crops	58	34	34	35	-	-	-	-	-	-	7
Arable silage/other fodder crops	45	20	23	9	70	-	-	31	-	-	11
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	3
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	2
Beans - animal consumption	0	5	5	12	-	-	-	-	-	-	22
Vegetables (brassicae)	98	9	98	2	-	-	-	-	-	-	5
Vegetables (other)	0	0	0	1	-	-	-	-	-	-	5
Soft Fruit	-	-	-	-	-	-	-	-	-	-	2
Top Fruit	-	-	-	-	-	-	-	-	-	-	2
Other tillage	1	0	0	49	-	-	-	-	-	-	5
All tillage	91	46	51	34	138	50	70	125	23	36	745
Grass under 5 years old	71	52	54	21	123	31	47	87	16	25	189
Grass 5 years and over	57	35	36	13	78	22	26	45	8	9	274
All grass	61	39	40	15	92	25	33	56	10	13	463
All crops and grass	76	43	46	25	120	39	54	92	17	25	1208

The data in this table apply to farms in the 'mixed' robust group, as detailed in Appendix 3.

Source: British Survey of Fertiliser Practice 2013

Table EW1.1 Total fertiliser use, England & Wales 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	93	29	34	20	139	75	65	130	22	22	145
Winter wheat	99	41	41	17	186	62	73	183	25	30	1117
Spring barley	97	47	56	23	111	44	60	109	21	33	625
Winter barley	98	45	54	18	144	52	72	141	23	38	326
Oats	91	43	46	20	106	58	74	97	25	34	189
Rye/triticale/Durum wheat	35	16	16	8	128	-	-	45	-	-	9
Potatoes (seed or earlies)	94	72	54	11	107	107	207	101	77	112	13
Potatoes (maincrop)	96	83	88	55	177	141	256	170	118	225	78
Sugar beet	99	40	67	56	96	61	110	94	24	74	117
Spring oilseed rape	100	41	45	11	121	58	65	121	24	30	82
Winter oilseed rape	99	43	38	18	187	60	69	186	26	26	422
Linseed	94	24	25	12	88	72	67	83	17	17	46
Forage maize	83	53	43	77	68	50	67	56	26	29	187
Rootcrops for stockfeed	77	60	60	43	94	42	69	72	25	41	51
Leafy forage crops	68	46	53	44	79	39	52	54	18	28	32
Arable silage/other fodder crops	52	45	47	35	71	29	53	37	13	25	63
Vining peas (for human consumption)	0	34	43	0	-	62	79	-	21	34	32
Field peas (harvested dry)	3	36	46	0	-	52	65	-	19	30	25
Field beans (harvested dry)	2	27	29	4	-	62	65	-	17	19	133
Vegetables (brassicae)	91	51	91	9	133	85	107	121	44	98	16
Vegetable Other	62	58	80	5	133	70	130	83	41	104	45
Soft Fruit	98	57	86	0	63	73	133	61	42	115	22
Top Fruit	94	36	61	4	64	21	73	60	8	45	33
Other tillage	24	25	24	7	67	42	68	16	11	17	44
All tillage	91	43	46	22	152	59	78	138	25	36	3852
Grass less than five years old	75	44	48	51	127	28	44	95	12	21	709
Grass five years and over	57	37	38	38	90	20	25	51	7	10	1969
All grass	60	38	39	40	96	21	29	57	8	11	2678
All crops and grass	74	40	42	31	128	40	53	95	16	22	6530

Source: British Survey of Fertiliser Practice 2013

Table EW1.2 Use of straight fertiliser, England & Wales 2013

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	90	8	13	132	119	77	119	10	10	145
Winter wheat	97	12	13	183	77	84	178	9	11	1117
Spring barley	88	5	13	103	64	76	91	3	10	625
Winter barley	93	3	11	138	74	82	129	2	9	326
Oats	86	6	10	102	49	96	88	3	10	189
Rye/triticale/Durum wheat	35	0	0	128	-	-	45	-	-	9
Potatoes (seed or earlies)	81	0	29	71	-	196	58	-	57	13
Potatoes (maincrop)	56	10	23	100	158	197	56	16	45	78
Sugar beet	94	3	31	93	62	124	87	2	38	117
Spring oilseed rape	100	10	20	114	-	76	114	-	15	82
Winter oilseed rape	99	10	12	180	70	85	179	7	10	422
Linseed	94	14	14	85	85	61	80	12	8	46
Forage maize	45	3	13	78	68	113	35	2	14	187
Rootcrops for stockfeed	36	0	13	110	-	98	40	-	12	51
Leafy forage crops	36	0	0	76	-	-	28	-	-	32
Arable silage/other fodder crops	19	3	3	77	-	-	15	-	-	63
Peas - human consumption	0	16	25	-	71	86	-	12	22	32
Peas - animal consumption	3	12	22	-	-	75	-	-	17	25
Beans - animal consumption	0	12	13	-	52	63	-	6	9	133
Vegetables (brassicae)	24	11	11	102	-	-	25	-	-	16
Vegetables (other)	51	19	41	107	56	82	54	11	33	45
Soft Fruit	98	57	86	63	73	133	61	42	115	22
Top Fruit	75	4	28	54	61	57	41	2	16	33
Other tillage	8	2	3	89	-	-	7	-	-	44
All tillage	85	9	14	149	75	90	127	6	12	3852
Grass under 5 years old	47	3	3	117	68	82	56	2	3	709
Grass 5 years and over	28	1	0	92	50	79	26	0	0	1969
All grass	31	1	1	97	57	81	30	1	1	2678
All crops and grass	56	5	7	134	73	89	75	3	6	6530

Source: British Survey of Fertiliser Practice 2013

Table EW1.3 Use of compound fertiliser, England & Wales 2013

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Spring wheat	13	21	21	81	58	57	10	12	12	145
Winter wheat	10	30	29	58	55	66	6	16	19	1117
Spring barley	27	41	43	63	42	55	17	17	24	625
Winter barley	16	42	43	73	50	69	12	21	30	326
Oats	14	37	36	67	59	67	9	22	24	189
Rye/triticale/Durum wheat	0	16	16	-	-	-	-	-	-	9
Potatoes (seed or earlies)	50	72	50	86	107	110	43	77	55	13
Potatoes (maincrop)	77	77	77	149	132	232	114	102	179	78
Sugar beet	16	37	45	48	61	80	7	23	36	117
Spring oilseed rape	17	31	26	36	49	57	6	15	15	82
Winter oilseed rape	20	34	27	35	55	61	7	19	16	422
Linseed	4	10	12	-	55	75	-	6	9	46
Forage maize	50	51	30	42	48	47	21	24	14	187
Rootcrops for stockfeed	60	60	53	55	42	54	33	25	29	51
Leafy forage crops	46	46	53	58	39	51	26	18	27	32
Arable silage/other fodder crops	38	43	45	58	27	49	22	11	22	63
Peas - human consumption	0	18	18	-	54	69	-	10	12	32
Peas - animal consumption	0	24	24	-	48	57	-	11	13	25
Beans - animal consumption	2	16	16	-	66	63	-	11	10	133
Vegetables (brassicae)	91	51	91	105	56	89	96	29	82	16
Vegetables (other)	36	39	39	80	77	181	29	30	70	45
Soft Fruit	0	0	0	-	-	-	-	-	-	22
Top Fruit	42	34	42	45	15	69	19	5	28	33
Other tillage	18	23	21	52	43	68	9	10	14	44
All tillage	19	35	33	62	54	70	12	19	23	3852
Grass under 5 years old	44	42	45	89	26	41	40	11	18	709
Grass 5 years and over	37	37	37	68	19	25	26	7	9	1969
All grass	38	38	38	72	20	27	28	8	10	2678
All crops and grass	29	36	36	69	35	46	20	13	16	6530

Source: British Survey of Fertiliser Practice 2013

Table EW1.4 Use of lime, England & Wales 2013

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Spring wheat	1.7	0.2	-	-	-	1.9	3.1	2.6	-	-	-	3.1	8	145
Winter wheat	2.5	0.9	0.4	-	0.0	3.8	4.4	6.0	3.9	-	2.5	4.7	43	1117
Spring barley	2.7	0.7	0.2	0.4	0.4	4.3	4.7	4.9	5.0	2.5	0.9	4.2	38	625
Winter barley	1.5	0.6	0.9	-	0.6	3.7	2.8	5.0	7.1	-	0.7	3.9	13	326
Oats	4.9	1.5	-	-	0.1	6.5	3.3	11.6	-	-	8.3	5.2	15	189
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	9
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	13
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	0	78
Sugar beet	5.1	7.7	0.5	16.8	1.0	31.2	6.2	3.2	5.0	6.0	5.0	5.3	33	117
Spring oilseed rape	1.5	2.3	-	-	0.6	4.4	4.1	5.0	-	-	2.5	4.4	5	82
Winter oilseed rape	6.0	0.9	0.4	0.7	-	7.9	4.2	7.1	5.0	6.1	-	4.7	36	422
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	0	46
Forage maize	5.0	0.9	0.3	-	0.1	6.4	3.7	4.1	4.4	-	5.0	3.8	16	187
Rootcrops for stockfeed	14.8	-	6.5	0.5	-	21.9	5.2	-	3.7	5.0	-	4.8	11	51
Leafy forage crops	7.2	2.0	-	-	2.8	12.0	4.3	3.4	-	-	4.5	4.2	7	32
Arable silage/other fodder crops	17.3	0.7	-	-	3.1	21.2	4.1	3.4	-	-	1.6	3.7	11	63
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	2	32
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	25
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	4	133
Vegetables (brassicae)	-	-	-	-	-	-	-	-	-	-	-	-	4	16
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	2	45
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	2	22
Top Fruit	-	-	-	-	25.6	25.6	-	-	-	-	0.4	0.4	6	33
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	44
All tillage	3.4	1.0	0.4	0.6	0.4	5.8	4.3	5.4	4.9	5.6	1.3	4.5	259	3852
Grass under 5 years old	3.2	0.1	0.3	-	0.3	3.9	4.8	4.8	4.7	-	3.7	4.7	50	709
Grass 5 years and over	1.4	0.0	0.6	-	0.3	2.3	4.2	3.1	3.0	-	1.0	3.5	70	1969
All grass	1.7	0.1	0.6	-	0.3	2.6	4.4	3.6	3.1	-	1.4	3.8	120	2678
All crops and grass	2.5	0.5	0.5	0.3	0.3	4.1	4.3	5.3	3.8	5.6	1.4	4.2	379	6530

Source: British Survey of Fertiliser Practice 2013

Table EW1.5 Percentage of crop area by field application rate - Nitrogen, England & Wales 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	7	1	2	4	4	16	32	17	12	3	2	-	-	-	-	-	-	-	145
Winter wheat	1	0	1	3	3	3	8	15	21	26	11	6	1	-	-	-	-	-	1117
Spring barley	3	2	5	11	15	19	33	10	2	-	-	-	-	-	-	-	-	-	625
Winter barley	2	0	1	6	8	15	23	21	17	5	1	0	1	-	-	-	-	-	326
Oats	9	1	9	6	18	29	14	13	0	1	-	-	-	-	-	-	-	-	189
Rye/triticale/Durum wheat	65	0	0	0	0	21	14	-	-	-	-	-	-	-	-	-	-	-	9
Potatoes (seed or earlies)	6	0	22	18	5	0	29	5	15	-	-	-	-	-	-	-	-	-	13
Potatoes (maincrop)	4	4	2	5	5	0	14	17	23	6	1	12	0	8	-	-	-	-	78
Sugar beet	1	0	10	11	36	31	10	0	0	1	-	-	-	-	-	-	-	-	117
Spring oilseed rape	0	3	11	5	7	23	18	28	1	3	1	-	-	-	-	-	-	-	82
Winter oilseed rape	1	0	1	5	1	3	8	15	21	24	16	3	1	1	-	-	-	-	422
Linseed	6	0	14	12	42	19	0	0	0	7	-	-	-	-	-	-	-	-	46
Forage maize	17	17	16	16	12	13	7	0	1	1	-	-	-	-	-	-	-	-	187
Rootcrops for stockfeed	23	2	11	16	22	9	6	5	0	1	5	-	-	-	-	-	-	-	51
Leafy forage crops	32	3	6	19	18	15	7	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	48	6	12	10	17	2	2	0	1	0	2	-	-	-	-	-	-	-	63
Peas - human consumption	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
Peas - animal consumption	97	0	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	98	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	133
Vegetables (brassicae)	9	0	21	0	29	6	0	0	25	0	0	0	11	-	-	-	-	-	16
Vegetables (other)	38	0	3	0	8	14	4	26	7	-	-	-	-	-	-	-	-	-	45
Soft Fruit	2	7	33	33	8	0	18	-	-	-	-	-	-	-	-	-	-	-	22
Top Fruit	6	19	12	31	19	4	5	3	-	-	-	-	-	-	-	-	-	-	33
Other tillage	76	8	3	5	1	0	5	2	-	-	-	-	-	-	-	-	-	-	44
All tillage	9	1	4	6	8	10	14	13	13	13	6	3	1	-	-	-	-	-	3852
Grass under 5 years old	25	1	10	9	12	8	10	7	4	5	4	4	1	-	-	-	-	-	709
Grass 5 years and over	43	2	15	12	7	7	5	3	2	2	1	1	-	-	-	-	-	-	1969
All grass	40	2	14	11	8	7	6	3	3	2	1	1	-	-	-	-	-	-	2678
All crops and grass	26	2	9	9	8	8	10	8	7	7	3	2	-	-	-	-	-	-	6530

Source: British Survey of Fertiliser Practice 2013

Table EW1.6 Percentage of crop area by field application rate - Phosphate, England & Wales 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	71	2	6	10	0	6	3	1	-	-	-	-	-	-	-	-	-	-	145
Winter wheat	59	3	12	18	4	2	1	1	-	-	-	-	-	-	-	-	-	-	1117
Spring barley	53	9	20	15	2	1	0	1	-	-	-	-	-	-	-	-	-	-	625
Winter barley	55	5	14	20	6	-	-	-	-	-	-	-	-	-	-	-	-	-	326
Oats	57	4	12	20	3	3	0	1	1	-	-	-	-	-	-	-	-	-	189
Rye/triticale/Durum wheat	84	0	0	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Potatoes (seed or earlies)	28	0	0	0	21	44	6	-	-	-	-	-	-	-	-	-	-	-	13
Potatoes (maincrop)	17	3	7	7	8	8	8	11	16	11	1	4	-	-	-	-	-	-	78
Sugar beet	60	4	11	13	7	2	1	0	1	-	-	-	-	-	-	-	-	-	117
Spring oilseed rape	59	4	16	7	11	2	-	-	-	-	-	-	-	-	-	-	-	-	82
Winter oilseed rape	57	6	11	16	6	4	1	1	-	-	-	-	-	-	-	-	-	-	422
Linseed	76	2	0	15	2	5	-	-	-	-	-	-	-	-	-	-	-	-	46
Forage maize	47	14	7	22	6	2	1	-	-	-	-	-	-	-	-	-	-	-	187
Rootcrops for stockfeed	40	8	29	19	4	-	-	-	-	-	-	-	-	-	-	-	-	-	51
Leafy forage crops	54	12	19	12	0	3	-	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	55	17	21	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	63
Peas - human consumption	66	14	2	2	12	0	4	-	-	-	-	-	-	-	-	-	-	-	32
Peas - animal consumption	64	7	0	26	3	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	73	2	4	16	1	3	1	-	-	-	-	-	-	-	-	-	-	-	133
Vegetables (brassicae)	49	0	41	0	0	0	0	0	0	0	0	11*	-	-	-	-	-	-	16
Vegetables (other)	42	7	1	29	13	0	8	-	-	-	-	-	-	-	-	-	-	-	45
Soft Fruit	43	5	22	0	9	21	-	-	-	-	-	-	-	-	-	-	-	-	22
Top Fruit	64	29	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Other tillage	75	10	3	11	0	0	0	1	-	-	-	-	-	-	-	-	-	-	44
All tillage	57	5	12	16	4	2	1	1	-	-	-	-	-	-	-	-	-	-	3852
Grass under 5 years old	56	24	13	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	709
Grass 5 years and over	63	25	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1969
All grass	62	25	11	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2678
All crops and grass	60	16	11	9	2	1	-	-	-	-	-	-	-	-	-	-	-	-	6530

* This value represents one instance, where a high phosphate application was made to correct a serious nutrient deficiency.

Source: British Survey of Fertiliser Practice 2013

Table EW1.7 Percentage of crop area by field application rate - Potash, England & Wales 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Spring wheat	66	2	11	10	6	4	0	2	-	-	-	-	-	-	-	-	-	-	145
Winter wheat	59	3	9	12	9	6	2	1	-	-	-	-	-	-	-	-	-	-	1117
Spring barley	44	5	19	15	12	3	1	1	-	-	-	-	-	-	-	-	-	-	625
Winter barley	46	3	10	11	20	8	0	1	-	-	-	-	-	-	-	-	-	-	326
Oats	54	2	9	13	11	6	2	3	-	-	-	-	-	-	-	-	-	-	189
Rye/triticale/Durum wheat	84	0	0	0	9	6	-	-	-	-	-	-	-	-	-	-	-	-	9
Potatoes (seed or earlies)	46	0	0	18	0	0	0	0	0	11	4	0	5	0	15	-	-	-	13
Potatoes (maincrop)	12	1	4	0	0	3	0	3	3	9	12	16	7	18	3	9	-	-	78
Sugar beet	33	0	6	5	19	17	10	2	4	2	1	1	-	-	-	-	-	-	117
Spring oilseed rape	55	2	13	20	4	4	0	3	-	-	-	-	-	-	-	-	-	-	82
Winter oilseed rape	62	2	10	12	7	4	0	1	1	-	-	-	-	-	-	-	-	-	422
Linseed	75	1	7	11	2	0	4	-	-	-	-	-	-	-	-	-	-	-	46
Forage maize	57	13	7	7	7	5	0	3	2	-	-	-	-	-	-	-	-	-	187
Rootcrops for stockfeed	40	0	27	13	6	9	0	3	1	0	0	1	-	-	-	-	-	-	51
Leafy forage crops	47	12	16	15	0	10	-	-	-	-	-	-	-	-	-	-	-	-	32
Arable silage/other fodder crops	53	14	15	6	2	10	0	1	-	-	-	-	-	-	-	-	-	-	63
Peas - human consumption	57	8	5	9	13	2	4	2	-	-	-	-	-	-	-	-	-	-	32
Peas - animal consumption	54	9	4	15	11	6	-	-	-	-	-	-	-	-	-	-	-	-	25
Beans - animal consumption	71	2	6	13	4	2	2	-	-	-	-	-	-	-	-	-	-	-	133
Vegetables (brassicae)	9	0	6	36	14	0	25	0	0	0	0	11*	-	-	-	-	-	-	16
Vegetables (other)	20	4	6	23	0	11	7	0	11	2	7	7	-	-	-	-	-	-	45
Soft Fruit	14	3	22	0	0	0	0	49	5	7	-	-	-	-	-	-	-	-	22
Top Fruit	39	5	27	3	7	6	3	10	0	1	-	-	-	-	-	-	-	-	33
Other tillage	76	7	4	5	2	0	5	-	-	-	-	-	-	-	-	-	-	-	44
All tillage	54	3	11	12	9	5	2	2	0	1	-	-	-	-	-	-	-	-	3852
Grass under 5 years old	52	18	13	7	7	2	0	1	-	-	-	-	-	-	-	-	-	-	709
Grass 5 years and over	62	22	11	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1969
All grass	61	22	11	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2678
All crops and grass	58	13	11	7	5	3	1	1	-	-	-	-	-	-	-	-	-	-	6530

* This value represents one instance, where a high potash application was made to correct a serious nutrient deficiency.

Source: British Survey of Fertiliser Practice 2013

Table EW2.1 Average fertiliser practice by grassland utilisation, England & Wales 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed not mown	51	33	32	27	81	18	19	41	6	6	1166
Grazed mown	73	47	50	58	107	25	37	78	12	18	1197
All grazings	58	38	38	38	93	21	27	54	8	10	2363
Cut for silage - grazed	82	54	56	69	118	26	41	97	14	23	797
Cut for silage - not grazed	89	50	58	75	137	26	42	122	13	24	192
All cut for silage	84	53	57	70	122	26	41	102	14	23	989
Cut for hay - grazed	55	34	35	37	72	21	26	40	7	9	428
Cut for hay - not grazed	54	35	38	28	90	24	32	49	8	12	84
All cut for hay	55	34	36	35	75	21	27	41	7	10	512
All mowings	74	47	50	59	112	25	38	83	12	19	1464
All grass	60	38	39	40	96	21	29	57	8	11	2678

Source: British Survey of Fertiliser Practice 2013

Table EW2.2 Percentage of grass area by field application rate - Nitrogen, England & Wales 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	49	2	17	10	6	6	4	2	2	1	-	-	-	-	-	-	-	-	1166
Grazed mown	27	2	11	14	10	9	9	6	4	3	3	1	-	-	-	-	-	-	1197
All grazings	42	2	15	12	7	7	5	3	2	2	1	1	-	-	-	-	-	-	2363
Cut for silage - grazed	18	1	8	14	13	10	11	8	5	5	4	2	-	-	-	-	-	-	797
Cut for silage - not grazed	11	3	5	11	13	8	16	9	6	6	4	7	2	0	0	0	1	-	192
All cut for silage	16	2	8	13	13	10	12	8	5	5	4	3	-	-	-	-	-	-	989
Cut for hay - grazed	45	2	18	17	5	6	5	1	1	-	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	46	2	7	13	13	7	8	0	2	1	0	0	0	1	-	-	-	-	84
All cut for hay	45	2	16	16	6	7	5	1	1	1	-	-	-	-	-	-	-	-	512
All mowings	26	2	10	14	11	9	10	6	4	4	3	2	-	-	-	-	-	-	1464
All grass	40	2	14	11	8	7	6	3	3	2	1	1	-	-	-	-	-	-	2678

Source: British Survey of Fertiliser Practice 2013

Table EW2.3 Percentage of grass area by field application rate - Phosphate, England & Wales 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	67	25	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1166
Grazed mown	53	26	15	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1197
All grazings	62	25	10	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2363
Cut for silage - grazed	46	28	18	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	797
Cut for silage - not grazed	50	23	24	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	192
All cut for silage	47	27	19	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	989
Cut for hay - grazed	66	22	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	65	19	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	84
All cut for hay	66	21	11	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	512
All mowings	53	25	16	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1464
All grass	62	25	11	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2678

Source: British Survey of Fertiliser Practice 2013

Table EW2.4 Percentage of crop area by field application rate - Potash, England & Wales 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	68	24	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1166
Grazed mown	50	20	16	8	4	1	0	1	-	-	-	-	-	-	-	-	-	-	1197
All grazings	62	22	10	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2363
Cut for silage - grazed	44	20	19	10	5	1	1	1	-	-	-	-	-	-	-	-	-	-	797
Cut for silage - not grazed	42	18	22	7	8	2	-	-	-	-	-	-	-	-	-	-	-	-	192
All cut for silage	43	19	19	9	6	1	1	1	-	-	-	-	-	-	-	-	-	-	989
Cut for hay - grazed	65	19	11	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	428
Cut for hay - not grazed	62	14	16	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	84
All cut for hay	64	19	12	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	512
All mowings	50	19	17	8	5	1	-	-	-	-	-	-	-	-	-	-	-	-	1464
All grass	61	22	11	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2678

Source: British Survey of Fertiliser Practice 2013

Table EW3.0 Product use by month of application, England & Wales 2013

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	7	21	39	22	7	2	1
Straight P	11	5	1	0	1	14	22	23	15	1	0	6
Straight K	4	5	5	3	1	18	25	21	13	2	1	2
Compounds	6	4	1	0	0	6	20	33	15	7	4	4
All fertilisers	3	2	1	0	0	7	21	36	19	7	3	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	1	0	0	0	0	6	20	39	22	8	3	1
Phosphate	10	6	1	0	1	10	21	28	13	3	2	5
Potash	6	5	2	1	0	11	22	30	12	5	2	3
Total	3	2	1	0	0	7	21	36	19	7	3	2

Note: All fertilisers includes other straight fertilisers (e.g. sulphur or trace elements)

'Product' refers to the total tonnage of the products used by the farmers in the survey year 2013.

'Nutrient' refers to the tonnage of each nutrient contained in the products used.

(e.g. 100 kg of a 20:10:10 compound contains 20 kg of N, 10 kg of P_2O_5 and 10 kg of K_2O, while 100 kg of ammonium nitrate (straight N) contains typically 34.5 kg of N).

Estimates of total nutrients are shown in Section B, Table B2.5.

Source: British Survey of Fertiliser Practice 2013

Table EW3.1 Product type as percentage of all product used by crop group, England & Wales 2013

column %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not specified	all grass	all crops and grass
Ammonium Nitrate	46.7	53.3	13.4	21.3	51.0	22.8	45.8	34.1	37.4	33.3	23.7	35.2	43.2
Urea	4.6	7.6	0.8	2.3	9.7	2.5	6.4	2.7	3.3	2.6	0.0	2.7	5.5
Calcium Ammonium Nitrate (CAN)	1.6	1.0	0.0	0.6	1.1	2.0	1.1	1.4	2.3	1.0	0.0	1.4	1.2
Urea Ammonium Nitrate (UAN)	9.2	13.7	1.0	8.9	13.5	4.5	11.2	2.6	1.1	2.8	32.7	2.8	9.2
Other Straight N	2.9	1.8	1.0	2.8	3.9	2.9	2.5	1.1	1.7	1.3	0.0	1.1	2.2
Triple Superphosphate (TSP)	1.8	2.5	3.0	0.8	1.8	5.4	2.4	0.5	0.2	0.5	3.7	0.6	2.0
Other Straight P	0.0	0.2	1.5	0.1	0.1	0.8	0.2	0.1	0.0	0.1	0.0	0.1	0.2
Muriate of Potash (MOP)	3.8	2.6	9.3	1.0	2.2	6.6	3.3	0.3	0.8	0.6	4.0	0.5	2.7
Other Straight K	0.2	0.2	2.4	21.3	0.5	4.6	1.7	0.3	0.2	0.4	5.7	0.4	1.4
PK	10.3	10.7	4.7	31.6	7.7	12.1	10.9	1.4	3.3	1.9	10.8	1.9	8.7
NK	1.6	0.6	2.2	1.4	0.1	4.8	1.2	5.4	3.4	8.7	1.2	6.0	2.4
Low N (<19% N)	7.2	2.5	58.2	4.8	6.4	18.9	8.1	3.8	4.1	3.5	0.0	3.5	7.0
High N (>=19% N)	9.9	2.9	1.9	0.7	1.6	10.6	4.6	46.2	42.3	43.2	18.3	43.7	14.1
Other	0.3	0.2	0.5	2.5	0.3	1.5	0.5	0.0	0.0	0.2	0.0	0.1	0.4
Total product ('000 tonnes)	**420**	**1122**	**78**	**87**	**426**	**140**	**2275**	**837**	**94**	**481**	**7**	**970**	**3245**

Source: British Survey of Fertiliser Practice 2013

Table EW3.2 Use of product type by crop group, England & Wales 2013

row %	spring cereal	winter cereal	potatoes	sugar beet	oilseed rape	other tillage	all tillage	grass for grazing	grass for hay	grass for silage	grass not specified	all grass	total product ('000 tonnes)
Ammonium Nitrate	18.2	55.2	1.0	1.9	20.8	3.0	76.1	83.8	10.0	46.5	0.3	23.9	1362
Urea	15.1	54.7	0.2	1.5	26.6	1.9	85.3	87.4	8.4	66.3	0.0	14.7	188
Calcium Ammonium Nitrate (CAN)	25.2	42.0	0.0	5.4	17.3	10.1	62.1	94.0	7.3	32.6	0.0	37.9	45
Urea Ammonium Nitrate (UAN)	13.8	61.2	0.2	2.2	20.3	2.2	92.3	82.7	5.5	60.3	14.2	7.7	333
Other Straight N	24.2	35.3	0.9	1.4	30.0	8.2	87.1	77.1	14.4	54.5	0.0	12.9	63
Triple Superphosphate (TSP)	15.8	49.8	3.4	0.6	17.1	13.3	88.6	89.6	1.0	38.2	2.3	11.4	65
Other Straight P	0.0	50.9	9.6	1.9	8.0	29.5	71.7	100.0	0.0	54.1	0.0	28.3	3
Muriate of Potash (MOP)	21.2	39.7	7.5	2.0	13.7	15.9	95.3	66.1	17.4	73.6	6.8	4.7	70
Other Straight K	5.3	11.7	2.5	57.2	8.2	15.1	92.3	77.8	1.7	57.7	19.8	7.7	41
PK	19.9	49.9	1.1	10.2	12.6	6.2	95.8	70.5	22.9	59.9	4.3	4.2	253
NK	30.3	27.5	5.8	7.5	1.9	27.0	34.3	71.8	5.3	85.7	0.1	65.7	89
Low N (<19% N)	14.5	17.8	31.5	1.3	15.0	20.0	85.1	90.1	15.2	44.5	0.0	14.9	178
High N (>=19% N)	43.7	27.0	5.8	0.7	9.3	13.4	16.5	90.3	9.9	46.1	0.1	83.5	544
Other	12.8	27.4	6.4	27.1	8.4	17.9	97.6	0.0	0.0	100.0	0.0	2.4	12
All Fertilisers	**18.5**	**49.3**	**3.4**	**3.8**	**18.7**	**6.2**	**70.1**	**86.3**	**9.7**	**49.6**	**0.7**	**29.9**	**3245**

Source: British Survey of Fertiliser Practice 2013

Table EW3.3 Product use by month of application, England & Wales 2013

row %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total product ('000 tonnes)
Ammonium Nitrate	0.0	6.0	19.9	38.6	22.4	8.4	2.9	1.1	0.5	0.1	0.0	0.0	1362
Urea	0.1	14.4	27.3	33.7	13.7	6.8	3.8	0.0	0.2	0.1	0.0	0.0	188
Calcium Ammonium Nitrate (CAN)	0.0	7.2	17.1	34.9	29.5	6.5	1.3	1.7	1.4	0.0	0.3	0.0	45
Urea Ammonium Nitrate (UAN)	0.0	7.4	19.2	42.0	24.6	5.2	0.3	0.5	0.4	0.4	0.0	0.0	333
Other Straight N	0.5	14.1	32.9	43.9	4.2	2.2	1.3	0.0	0.1	0.5	0.2	0.0	63
Triple Superphosphate (TSP)	1.4	13.4	20.9	23.8	16.0	1.1	0.0	6.3	10.8	5.2	0.8	0.2	65
Other Straight P	0.0	25.2	35.8	9.0	0.0	0.0	0.0	0.0	26.2	3.8	0.0	0.0	3
Muriate of Potash (MOP)	0.5	15.0	25.7	26.4	16.3	3.0	0.0	3.3	4.7	3.1	1.1	1.0	70
Other Straight K	2.9	24.0	24.1	11.7	7.6	0.0	1.4	0.0	1.5	8.6	12.6	5.6	41
PK	0.6	10.0	21.2	15.8	2.6	1.0	2.3	4.5	20.1	16.1	5.1	0.8	253
NK	0.0	3.0	14.7	29.4	12.9	23.8	8.6	7.2	0.1	0.3	0.0	0.0	89
Low N (<19% N)	0.1	10.1	18.6	41.8	14.5	3.1	0.2	4.6	5.7	1.0	0.2	0.0	178
High N (>=19% N)	0.0	2.4	20.0	39.0	20.9	8.7	5.4	2.9	0.7	0.0	0.0	0.0	544
Other	4.3	9.6	39.7	6.4	18.3	0.1	0.0	5.9	0.0	1.4	0.0	14.3	12
All Fertilisers	**0.2**	**7.2**	**20.7**	**35.9**	**18.9**	**7.1**	**2.9**	**2.1**	**2.6**	**1.7**	**0.6**	**0.2**	**3245**

Source: British Survey of Fertiliser Practice 2013

Table EW4.1a Average fertiliser practice on tillage and grassland by GOR, England & Wales 2013

		Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
		N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
North West	All tillage	91	39	66	47	117	39	79	106	15	52	105
	All grass	76	54	58	60	102	18	28	78	10	16	291
	All crops and grass	78	52	59	58	104	20	35	82	11	21	396
North East	All tillage	97	67	74	20	159	60	74	154	40	55	169
	All grass	39	28	29	19	88	21	30	35	6	9	192
	All crops and grass	59	41	44	19	128	42	55	75	17	24	361
Eastern	All tillage	93	38	39	15	154	67	84	144	26	33	643
	All grass	46	15	17	8	105	38	38	48	6	6	88
	All crops and grass	88	36	37	14	151	65	81	133	23	30	731
Yorkshire and the Humber	All tillage	93	42	44	20	163	63	82	152	27	36	775
	All grass	74	38	36	42	93	20	27	69	8	10	300
	All crops and grass	87	41	41	27	143	50	66	124	21	27	1075
West Midlands	All tillage	92	44	47	27	140	62	92	129	27	43	394
	All grass	69	32	34	36	93	20	25	64	6	9	255
	All crops and grass	80	37	40	32	119	44	62	96	16	25	649
East Midlands	All tillage	95	41	42	12	160	58	75	153	24	32	569
	All grass	64	40	36	34	118	22	27	75	9	10	174
	All crops and grass	84	41	40	20	150	46	61	126	19	24	743
South West	All tillage	86	54	56	35	138	51	66	119	27	37	582
	All grass	51	33	33	46	96	22	31	49	7	10	723
	All crops and grass	62	40	40	42	115	35	47	72	14	19	1305
South East	All tillage	84	33	38	20	153	56	72	129	19	28	503
	All grass	34	13	14	13	85	22	26	29	3	4	242
	All crops and grass	64	25	29	17	139	49	63	89	12	18	745
Wales	All tillage	88	54	55	45	102	45	65	89	24	36	112
	All grass	66	54	54	42	90	23	29	59	12	16	413
	All crops and grass	68	54	54	43	91	25	32	62	13	17	525

Source: British Survey of Fertiliser Practice 2013

Table EW4.1b Average fertiliser practice on tillage and grassland by BSFP region, England & Wales 2013

		Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
		N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Wessex	All tillage	84	44	48	30	142	51	62	120	22	30	290
	All grass	38	16	16	35	101	24	35	39	4	5	278
	All crops and grass	58	28	29	33	126	42	54	73	12	16	568
Anglia	All tillage	93	38	39	15	154	67	84	144	26	33	643
	All grass	46	15	17	8	105	38	38	48	6	6	88
	All crops and grass	88	36	37	14	151	65	81	133	23	30	731
Northern	All tillage	95	64	76	26	153	60	81	146	39	61	165
	All grass	63	45	48	44	92	20	30	58	9	14	371
	All crops and grass	68	48	53	41	106	29	42	72	14	22	536
North East	All tillage	94	45	46	21	162	62	79	152	27	36	831
	All grass	71	40	39	38	92	20	27	66	8	10	358
	All crops and grass	85	43	43	28	140	47	62	120	20	27	1189
North Mercia	All tillage	92	41	59	38	136	54	90	124	22	53	193
	All grass	70	39	42	58	117	19	27	83	7	11	189
	All crops and grass	77	39	47	52	124	30	51	95	12	24	382
South Mercia	All tillage	91	46	44	20	137	61	79	125	28	35	286
	All grass	59	31	30	17	68	18	20	40	5	6	138
	All crops and grass	77	40	38	19	114	47	58	88	19	22	424
East Midland	All tillage	95	41	42	12	160	58	75	153	24	32	569
	All grass	64	40	36	34	118	22	27	75	9	10	174
	All crops and grass	84	41	40	20	150	46	61	126	19	24	743
South East	All tillage	84	33	38	20	153	56	72	129	19	28	503
	All grass	34	13	14	13	85	22	26	29	3	4	242
	All crops and grass	64	25	29	17	139	49	63	89	12	18	745
South West	All tillage	89	67	69	51	129	49	78	114	33	54	260
	All grass	63	49	49	57	95	21	30	60	10	15	427
	All crops and grass	68	53	53	56	105	29	44	71	15	23	687
Wales	All tillage	88	54	55	45	102	45	65	89	24	36	112
	All grass	66	54	54	42	90	23	29	59	12	16	413
	All crops and grass	68	54	54	43	91	25	32	62	13	17	525

Source: British Survey of Fertiliser Practice 2013

Table SC1.1 Total fertiliser use, Scotland 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	100	72	81	21	182	63	82	182	46	66	91
Spring barley	99	94	93	31	107	54	74	107	51	69	254
Winter barley	100	81	81	28	155	70	78	155	57	63	48
Oats	96	79	79	21	109	61	81	105	48	64	53
Potatoes	93	89	89	14	167	144	217	154	128	193	16
Winter oilseed rape	100	77	81	13	198	64	70	198	49	57	28
Other crops	83	69	68	51	93	60	75	77	42	51	86
All tillage	98	86	87	29	127	59	78	124	51	68	576
Grass less than five years old	89	72	76	37	117	32	46	103	23	35	294
Grass five years and over	64	54	53	21	85	21	24	54	11	13	406
All grass	71	59	59	25	96	24	31	68	14	19	700
All crops and grass	80	68	69	26	109	40	52	87	27	36	1276

Source: British Survey of Fertiliser Practice 2013

Table SC1.2 Use of straight fertiliser, Scotland 2013

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	95	20	31	168	64	75	160	13	23	91
Spring barley	67	4	9	74	61	83	50	2	7	254
Winter barley	98	21	21	144	84	79	141	18	17	48
Oats	65	16	16	97	-	-	63	-	-	53
Potatoes	40	0	45	-	-	189	-	-	84	16
Winter oilseed rape	100	22	32	175	60	55	175	13	18	28
Other crops	39	5	9	101	-	101	39	-	9	86
All tillage	73	9	15	109	67	86	79	6	13	576
Grass less than five years old	28	0	2	115	-	-	32	-	-	294
Grass five years and over	15	0	0	113	106	-	17	0	-	406
All grass	19	0	0	114	93	119	22	0	1	700
All crops and grass	37	3	6	110	69	88	41	2	5	1276

Source: British Survey of Fertiliser Practice 2013

Table SC1.3 Use of compound fertiliser, Scotland 2013

	Crop area receiving dressing (%)			Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Winter wheat	26	52	50	82	63	85	21	33	43	91
Spring barley	88	90	86	65	54	72	57	49	61	254
Winter barley	29	62	62	46	64	75	13	39	46	48
Oats	45	63	63	96	60	71	43	38	45	53
Potatoes	89	89	54	133	144	200	118	128	109	16
Winter oilseed rape	47	55	49	50	66	80	24	36	39	28
Other crops	61	65	58	62	60	71	37	39	42	86
All tillage	68	77	73	67	58	75	46	45	55	576
Grass less than five years old	74	72	75	96	32	44	71	23	33	294
Grass five years and over	52	53	53	70	20	24	37	11	12	406
All grass	58	58	59	79	24	31	46	14	18	700
All crops and grass	62	65	64	75	38	48	46	25	31	1276

Source: British Survey of Fertiliser Practice 2013

Table SC1.4 Use of lime, Scotland 2013

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)							
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Fields limed	Fields in sample
Winter wheat	5.3	-	6.7	-	-	12.1	3.7	-	5.0	-	-	4.4	9	91
Spring barley	12.3	-	2.8	-	8.4	23.5	3.7	-	5.0	-	0.4	2.7	57	254
Winter barley	7.7	-	0.7	-	1.8	10.2	3.9	-	3.8	-	1.0	3.4	7	48
Oats	-	-	-	-	-	-	-	-	-	-	-	-	4	53
Potatoes	-	-	-	-	-	-	-	-	-	-	-	-	0	16
Winter oilseed rape	-	-	-	-	-	-	-	-	-	-	-	-	4	28
Other crops	10.3	-	7.1	-	2.8	20.2	4.9	-	5.1	-	0.9	4.4	20	86
All tillage	10.0	-	3.4	-	5.3	18.7	3.8	-	5.0	-	0.5	3.1	101	576
Grass less than five years old	6.1	-	0.9	-	2.0	9.0	3.7	-	5.5	-	0.4	3.2	36	294
Grass five years and over	2.4	-	0.2	-	0.4	3.0	3.6	-	5.0	-	1.0	3.4	21	406
All grass	3.4	-	0.4	-	0.8	4.6	3.7	-	5.3	-	0.6	3.3	57	700
All crops and grass	5.7	-	1.4	-	2.4	9.5	3.7	-	5.0	-	0.5	3.1	158	1276

Source: British Survey of Fertiliser Practice 2013

Table SC1.5 Percentage of crop area by field application rate - Nitrogen, Scotland 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	0	0	0	5	1	4	8	10	36	23	13	-	-	-	-	-	-	-	91
Spring barley	1	1	2	9	19	51	13	2	2	0	0	1	-	-	-	-	-	-	254
Winter barley	0	0	4	3	0	9	21	23	37	2	-	-	-	-	-	-	-	-	48
Oats	4	0	6	9	7	51	17	7	-	-	-	-	-	-	-	-	-	-	53
Potatoes	7	0	0	5	14	11	10	12	5	25	3	9	-	-	-	-	-	-	16
Winter oilseed rape	0	0	0	0	0	2	4	16	28	31	10	8	-	-	-	-	-	-	28
Other crops	17	1	19	15	21	10	4	6	2	5	0	0	1	-	-	-	-	-	86
All tillage	2	1	3	8	13	35	12	6	11	6	2	1	-	-	-	-	-	-	576
Grass less than five years old	11	1	7	19	15	15	7	8	5	4	2	3	0	1	0	0	0	1	294
Grass five years and over	36	4	13	18	10	5	6	3	1	2	0	1	0	1	-	-	-	-	406
All grass	29	3	12	18	11	8	6	5	2	2	1	1	0	1	-	-	-	-	700
All crops and grass	20	2	9	15	12	17	8	5	5	4	1	1	0	1	-	-	-	-	1276

Source: British Survey of Fertiliser Practice 2013

Table SC1.6 Percentage of crop area by field application rate - Phosphate, Scotland 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	28	2	13	32	24	-	-	-	-	-	-	-	-	-	-	-	-	-	91
Spring barley	6	5	27	53	8	1	-	-	-	-	-	-	-	-	-	-	-	-	254
Winter barley	19	2	17	29	27	7	-	-	-	-	-	-	-	-	-	-	-	-	48
Oats	21	3	17	43	8	7	-	-	-	-	-	-	-	-	-	-	-	-	53
Potatoes	11	0	0	16	0	21	10	29	0	0	4	6	3	-	-	-	-	-	16
Winter oilseed rape	23	2	5	50	19	-	-	-	-	-	-	-	-	-	-	-	-	-	28
Other crops	31	15	20	12	9	5	1	5	1	-	-	-	-	-	-	-	-	-	86
All tillage	14	5	22	44	12	2	0	1	-	-	-	-	-	-	-	-	-	-	576
Grass less than five years old	28	30	28	12	1	1	-	-	-	-	-	-	-	-	-	-	-	-	294
Grass five years and over	46	37	13	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	406
All grass	41	35	18	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	700
All crops and grass	32	25	19	18	5	1	-	-	-	-	-	-	-	-	-	-	-	-	1276

Source: British Survey of Fertiliser Practice 2013

Table SC1.7 Percentage of crop area by field application rate - Potash, Scotland 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Winter wheat	19	0	10	29	20	10	5	5	1	-	-	-	-	-	-	-	-	-	91
Spring barley	7	1	11	37	28	13	1	1	-	-	-	-	-	-	-	-	-	-	254
Winter barley	19	0	8	32	32	5	3	-	-	-	-	-	-	-	-	-	-	-	48
Oats	21	7	11	20	11	25	5	-	-	-	-	-	-	-	-	-	-	-	53
Potatoes	11	0	0	0	0	5	0	42	10	5	10	0	0	0	10	3	6	-	16
Winter oilseed rape	19	0	14	41	17	6	4	-	-	-	-	-	-	-	-	-	-	-	28
Other crops	32	11	12	14	13	7	1	4	3	2	-	-	-	-	-	-	-	-	86
All tillage	13	2	11	32	24	12	2	2	1	-	-	-	-	-	-	-	-	-	576
Grass less than five years old	24	22	24	18	5	3	2	1	-	-	-	-	-	-	-	-	-	-	294
Grass five years and over	47	35	13	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	406
All grass	41	31	16	7	2	2	1	-	-	-	-	-	-	-	-	-	-	-	700
All crops and grass	31	21	14	16	9	5	1	1	-	-	-	-	-	-	-	-	-	-	1276

Source: British Survey of Fertiliser Practice 2013

Table SC2.1 Average fertiliser practice by grassland utilisation, Scotland 2013

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P_2O_5	K_2O	FYM	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
Grazed not mown	60	50	51	13	74	18	18	44	9	9	353
Grazed mown	95	82	81	38	116	32	46	110	26	37	146
All grazings	67	56	56	18	85	22	25	57	12	14	499
Cut for silage - grazed	95	82	81	40	123	34	50	117	27	40	122
Cut for silage - not grazed	95	73	78	65	138	36	55	130	26	43	159
All cut for silage	95	77	79	53	131	35	52	124	27	42	281
Cut for hay - grazed	93	87	83	27	86	25	33	80	22	27	27
Cut for hay - not grazed	77	67	61	34	94	33	55	72	22	33	39
All cut for hay	86	78	73	31	89	28	42	76	22	30	66
All mowings	93	77	78	49	125	34	50	116	26	39	342
All grass	71	59	59	25	96	24	31	68	14	19	700

Source: British Survey of Fertiliser Practice 2013

Table SC2.2 Percentage of grass area by field application rate - Nitrogen, Scotland 2013

	kg/ha																	Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	40	4	15	21	8	2	4	3	0	1	0	1	0	1	-	-	-	-	353
Grazed mown	5	3	8	11	17	18	11	12	4	8	1	1	0	1	-	-	-	-	146
All grazings	33	4	13	19	10	5	5	4	1	2	0	1	0	1	-	-	-	-	499
Cut for silage - grazed	5	3	8	9	15	17	12	15	5	9	1	1	0	1	-	-	-	-	122
Cut for silage - not grazed	5	1	2	11	18	20	10	6	9	5	4	5	1	2	0	0	0	1	159
All cut for silage	5	2	5	10	17	19	11	10	7	7	3	3	0	1	0	0	0	1	281
Cut for hay - grazed	7	0	8	24	29	20	5	7	-	-	-	-	-	-	-	-	-	-	27
Cut for hay - not grazed	23	2	10	16	22	8	6	14	-	-	-	-	-	-	-	-	-	-	39
All cut for hay	14	1	9	20	26	14	5	10	-	-	-	-	-	-	-	-	-	-	66
All mowings	7	2	6	11	18	18	10	9	6	6	2	3	0	1	-	-	-	-	342
All grass	29	3	12	18	11	8	6	5	2	2	1	1	0	1	-	-	-	-	700

Source: British Survey of Fertiliser Practice 2013

Table SC2.3 Percentage of grass area by field application rate - Phosphate, Scotland 2013

	kg/ha																	Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	50	38	10	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	353
Grazed mown	18	37	34	7	2	3	-	-	-	-	-	-	-	-	-	-	-	-	146
All grazings	44	38	15	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	499
Cut for silage - grazed	18	31	38	7	3	3	-	-	-	-	-	-	-	-	-	-	-	-	122
Cut for silage - not grazed	27	24	30	15	1	1	-	-	-	-	-	-	-	-	-	-	-	-	159
All cut for silage	23	28	34	11	2	2	-	-	-	-	-	-	-	-	-	-	-	-	281
Cut for hay - grazed	13	61	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27
Cut for hay - not grazed	33	15	45	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39
All cut for hay	22	40	28	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66
All mowings	23	30	33	11	2	2	-	-	-	-	-	-	-	-	-	-	-	-	342
All grass	41	35	18	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	700

Source: British Survey of Fertiliser Practice 2013

Table SC2.4 Percentage of grass area by field application rate - Potash, Scotland 2013

	kg/ha																		Fields in
row %	0	<25	25-	50-	75-	100-	125-	150-	175-	200-	225-	250-	275-	300-	325-	350-	375-	400+	sample
Grazed not mown	49	37	13	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	353
Grazed mown	19	26	25	19	2	6	2	0	1	-	-	-	-	-	-	-	-	-	146
All grazings	44	35	15	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	499
Cut for silage - grazed	19	20	27	20	3	8	3	0	1	-	-	-	-	-	-	-	-	-	122
Cut for silage - not grazed	22	14	24	23	10	4	1	3	-	-	-	-	-	-	-	-	-	-	159
All cut for silage	21	17	25	21	6	6	2	2	-	-	-	-	-	-	-	-	-	-	281
Cut for hay - grazed	17	50	16	10	0	0	7	-	-	-	-	-	-	-	-	-	-	-	27
Cut for hay - not grazed	39	15	15	25	0	0	0	7	-	-	-	-	-	-	-	-	-	-	39
All cut for hay	27	34	15	17	0	0	3	3	-	-	-	-	-	-	-	-	-	-	66
All mowings	22	19	24	21	6	5	2	1	-	-	-	-	-	-	-	-	-	-	342
All grass	41	31	16	7	2	2	1	-	-	-	-	-	-	-	-	-	-	-	700

Source: British Survey of Fertiliser Practice 2013

Table SC3.0 Product use by month of application, Scotland 2013

(a) Product use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Straight N	0	0	0	0	0	5	13	37	32	7	4	2
Straight P	11	1	0	0	0	20	28	32	6	1	0	2
Straight K	3	3	0	0	0	15	42	28	5	3	0	1
Compounds	2	1	0	0	0	1	11	53	19	8	3	2
All fertilisers	1	1	0	0	0	3	13	47	23	8	4	2

(b) Nutrient use

row %	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Nitrogen	0	0	0	0	0	2	11	45	27	9	4	2
Phosphate	4	1	0	0	0	3	13	55	14	5	1	3
Potash	3	1	0	0	0	3	17	51	15	5	2	2
Total	2	1	0	0	0	2	13	48	22	7	3	2

Note: All fertilisers includes other straight fertilisers (e.g. sulphur or trace elements)

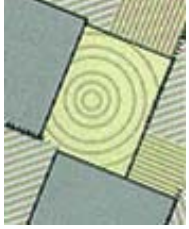
'Product' refers to the total tonnage of the products used by the farmers in the survey year 2013.

'Nutrient' refers to the tonnage of each nutrient contained in the products used.

(e.g. 100 kg of a 20:10:10 compound contains 20 kg of N, 10 kg of P_2O_5 and 10 kg of K_2O, while 100 kg of ammonium nitrate (straight N) contains typically 34.5 kg of N).

Estimates of total nutrients are shown in Section B, Table B2.5.

Source: British Survey of Fertiliser Practice 2013



SECTION D

USE OF ORGANIC MANURES – GREAT BRITAIN, 2013

Introduction

Whilst the British Survey of Fertiliser Practice has focussed historically on the application of manufactured fertilisers, in recent years it has also collected increasingly detailed information on the use and movement of organic manures. In previous years, farmers were asked where their manure applications fell within pre-specified 'high', 'medium' and 'low' ranges. In 2007, in an effort to better quantify the organic manure data, farmers were asked to provide a specific rate of application which could then be weighted in the same way as the manufactured fertiliser data to deliver a national picture of organic manure usage. However, it should be remembered that the underlying sample design is constructed to measure manufactured fertiliser usage and may not represent the population of farmers using organic manures as robustly.

D1 FARMS HANDLING ORGANIC MANURES

Organic manures applied to agricultural land may be produced on farm by livestock as slurries, farmyard manure (FYM) and poultry manures or imported from other sources such as treated sewage sludges (also called bio-solids) and some industrial 'wastes' such as compost, paper waste or brewery effluent.

Of the 1,360 farms in the survey, around 68% (922) used organic manures on at least one field on the farm, the details are shown in Table D1.1a.

Table D1.1a Numbers and percentage (%) of farms using each type of manure in Great Britain, 2013

	none	*cattle FYM*	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other farm*	*bio-solids*	*other non-farm*	*total with manure*
Farms in sample	438	692	246	33	16	41	46	55	9	50	24	922
Farms in population	31,963	45,927	15,682	1,708	623	2,330	1,808	4,252	394	1,839	996	58,848
Farms in population %	35%	51%	17%	2%	1%	3%	2%	5%	0%	2%	1%	65%
Volume (Mt; Mm^3)	n/a	34.2	39.8	1.4	2.0	0.9	0.6	1.5	1.2	2.6	1.0	85.2
Volume %	n/a	40%	47%	2%	2%	1%	1%	2%	1%	3%	1%	100%

Note: some farmers may use more than one type of manure. Mt; Mm^3 are Million tonnes and cubic metres.

Table D1.1b Percentage (%) of farms using each type of manure in Great Britain, 2009 - 2013

	none	*cattle FYM*	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other*
2009	32	53	17	2	1	2	2	3	4
2010	33	53	17	2	1	2	2	4	4
2011	32	53	17	2	1	2	2	5	5
2012	36	48	19	2	1	2	2	4	5
2013	35	51	17	2	1	3	2	5	4

Cattle manure from beef and dairy farms is by far the largest volume of manure type generated in Great Britain. The percentage of farms using cattle FYM has declined by 2% since 2009, whereas the use of cattle slurry is more consistent over the period and used on 17% of farms in 2013.

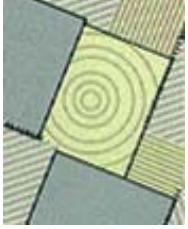


Table D1.1c Dressing cover of organic manure in Great Britain, 2009 - 2013

	all tillage	*grass 5 years and over*	*grass under 5 years old*
2009	20	35	43
2010	21	33	46
2011	22	32	47
2012	23	32	47
2013	23	35	47

Dressing covers of organic manure have increased gradually over the 5 year period. In 2013 23% of the tillage area received a dressing, with higher percentages on both categories of grass.

Not all the manure generated by a farm is necessarily retained for use by that farm and excess manure/slurry can be exported for use elsewhere. Details of estimates of manure exports are given in Table D1.2.

Table D1.2 Estimated volumes of exported manures and percentage (%) of farms exporting manures of each type, Great Britain 2009 - 2013

	cattle FYM		*cattle slurry*		*other*		*farms in population*
	vol Mt	*%*	*vol Mm*^{3}	*%*	*vol Mt*	*%*	
2009	0.8	1.4	0.5	0.3	0.0	0.1	89,404
2010	0.6	1.6	1.2	0.5	0.0	0.5	88,901
2011	0.6	1.9	0.3	0.4	0.1	0.7	90,386
2012	0.8	2.4	0.2	0.4	0.4	0.9	90,132
2013	0.6	1.7	0.9	0.8	1.5	1.1	90,811

Note: some farmers exported more than one type of manure
Note: other includes manure types not mentioned, these can other farm manures or non farm, e.g brewers grains

This indicates that only about 2% of the farmers surveyed exported manures and that cattle FYM is exported by more farms than any other manure. Data on manure types other than cattle FYM should be treated with caution due to the small numbers in the sample.

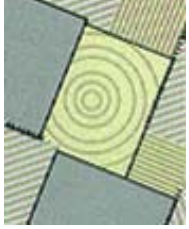
The percentage of farms exporting cattle manures is reasonably consistent over the five year period 2009-13. Exports of other types of manures remain at a low level, and appear more variable over the period, but overall the number of exporting farms in the sample is low.

Table D1.3a Estimated volumes of imported manures, Mt or Mm^3, Great Britain 2009 - 2013

	cattle FYM/ slurry	*pig FYM/ slurry*	*layer/hen manure*	*broiler/ turkey litter*	*other FYM*	*bio-solids*	*composted green manure*	*other*	*farms in population*
2009	1.6	0.6	0.3	0.5	0.1	3.8	1.1	0.7	89,404
2010	1.4	0.7	0.3	0.5	0.1	2.3	0.5	0.5	88,902
2011	1.7	0.5	0.2	0.5	0.1	2.5	1.2	0.7	90,386
2012	1.8	1.1	0.3	0.6	0.1	4.5	1.1	0.5	90,132
2013	2.0	0.9	0.3	0.4	0.3	3.1	0.7	0.7	90,811

Note: some farmers imported more than one type of manure

The amount of imported non-farm manures increased each year between 2003 and 2009 to 5.6 million tonnes. In 2013 the volume of imported non farm manures was 4.5 million tonnes, a decrease to the volumes reported in 2012. However, care should be taken with the interpretation of these figures given the small number of farms involved. Cattle and pig FYM are the farm-produced manures most likely to be imported.



Note that there is an imbalance between the estimate of manures exported from farms (3.0 million tonnes in 2013) and the estimate of imports (3.9 million tonnes). This is likely to be due to sampling error given the small proportion of farms involved.

Table D1.3b Percentage (%) of farms importing manures of each type, Great Britain 2009 - 2013

	cattle FYM/ slurry	*pig FYM/ slurry*	*layer/hen manure*	*broiler/ turkey litter*	*other FYM*	*bio-solids*	*composted green manure*	*other*	*farms in population*
2009	2.9	1.2	1.2	1.6	0.2	2.2	0.4	0.8	89,404
2010	2.0	1.2	1.2	2.1	0.3	2.6	0.6	1.0	88,902
2011	2.9	1.0	0.8	1.7	0.2	2.3	1.2	0.7	90,386
2012	3.3	1.3	1.1	1.8	0.3	2.8	1.1	0.7	90,132
2013	2.8	1.1	1.1	1.3	0.3	1.5	0.5	0.9	90,811

In 2013 the percentage of farms importing cattle manures decreased slightly to 2.8%. The proportion of farms importing bio-solids and composted green manure was markedly lower than reported in 2012.

The number and percentage of farms using each type of slurry application method in Great Britain are shown in Table 1.4. These data serve as a guide only and are calculated as an expression of the number of farms adopting a proportion of each application method, where slurry was applied. The data do not account for the proportion of each farm's total cultivatable area receiving slurry, or any variation in the rate at which slurry may have been applied using different application methods. Notwithstanding these considerations, it is clear that broadcast application is by far the most widespread method adopted for both types of slurry.

Table D1.4 Number and percentage (%) of farms using each type of application method by slurry type, Great Britain 2013

			percentage of farms						
	farms in sample	*farms in population*	*broadcast*	*band spread*	*shallow injection*	*deep injection*	*rain gun*	*rotating boom*	*non-broadcast*
Cattle slurry	246	15,682	83	7	10	3	0	0	20
Pig slurry	16	623	54	32	17	0	4	0	53
Grand Total	261	16,284	82	8	10	3	0	0	22

Note: some farms may apply both types of slurry

Whilst some of these application methods (e.g. shallow injection or deep injection) apply slurry below the surface of the field, the majority require secondary cultivation to incorporate the manure/slurry into the soil. Assessment of how often organic manures are incorporated into the soil is complicated by the fact that some farmers make more than one application or apply more than one type of manure and may incorporate each of these differently. As manure on grass fields is seldom incorporated (unless they are destined for re-seeding), grass fields have been excluded from the incorporation analysis.

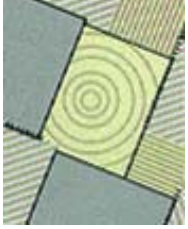


Table D1.5 gives estimates of the volume and area of manure/slurry incorporation on tillage fields by manure type and immediacy of incorporation. Farmyard manure is the most extensively incorporated at 95% of the volume with 87% of it incorporated within a week of spreading on tillage fields. Cattle and pig slurries are less likely to be incorporated with 17% and 19% of the volume respectively not incorporated. The high proportion of the pig slurry which is not incorporated is thought to be due in part to its application as a spring top-dressing to winter sown crops (see Table D2.4).

Table D1.5 Percentage (%) of organic manure incorporated (volume and area) on tillage fields by incorporation time and manure/slurry type, Great Britain 2013

	incorporation time after spreading										*total*	
	not incorporated		*within 6 hours*		*between 6 and 24 hours*		*between 1 and 7 days*		*more than 1 week*		*applied area*	*volume applied*
	%area	*%vol*	*%area*	*%vol*	*%area*	*%vol*	*%area*	*%vol*	*%area*	*%vol*	*'000 ha*	*'Mt; Mm³*
FYM	6	5	15	14	26	26	40	40	13	13	663	15.4
Cattle slurry	20	17	9	8	14	17	36	35	18	20	90	2.8
Pig slurry	21	19	44	47	14	16	20	17	1	1	59	1.7
Poultry FYM	2	2	9	6	66	72	15	13	8	7	164	1.3
Other	9	10	23	23	31	33	35	31	3	3	158	3.2
Total	8	8	16	17	31	28	34	35	11	12	1,134	24.4

Farmers were asked to indicate what proportion of their livestock manures had been spread by a contractor (Table D1.6a). The percentage of farmers using a contractor to spread at least some of their FYM was 23% in 2013. Where contractors were used they were applying between 85% and 89% of the manure on average.

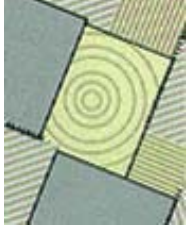
Table D1.6a Use of contractors to spread manure/slurry in current season, Great Britain 2013

	% of farms using a contractor	*% volume applied by contractor*	*average % of contractor-applied manure, where contractor is used*
FYM	23	29	89
Cattle slurry	28	26	85
Other	52	55	88
Total	30	30	88

Use of contractors to spread manures is consistent over the 5 year period 2009-2013, on 28-32% of farms (Table 1.6b), as was the average amount spread, at 84-88%.

Table D1.6b Use of contractors to spread manure/slurry, Great Britain 2009-2013

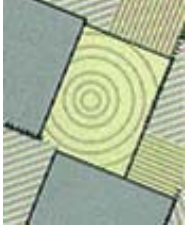
	% of farms using a contractor	*% volume applied by contractor*	*average % of contractor-applied manure, where contractor is used*
2009	32	28	86
2010	29	27	84
2011	28	29	86
2012	32	32	84
2013	30	30	88



D2 USE OF ORGANIC MANURES

In recent years there has been a great deal of promotional activity aimed at encouraging farmers to make adjustments to fertiliser inputs where manures are used. When making comparisons of the data presented in this report a number of factors should be taken into account:

- the extent to which individual farmers have accounted for the nutrients in the manures cannot be judged from these data,
- the data presented for 'with/without' manure are not a paired comparison of otherwise identical fields,
- fields which have not received manures may be on farms which have no manure and are thus managed in a different way,
- in grassland systems, fields which have not received manures may be managed differently (e.g. grazed only) compared with manured fields which may be cut more than once as well as grazed,
- for tillage crops, the overall fertiliser rate means that some fields are included which have received no fertiliser. For the 'with manure' data, it may indicate that the manure was judged to supply all the fertiliser which was required,
- for grassland, the average fertiliser rate has been used so as to avoid distorting the data by inclusion of 'unmanaged' grass, which receives no fertiliser, although this has the effect of excluding any fields on which no fertiliser was applied because the manure was considered sufficient, thus obscuring a substitution effect,
- the dataset of fields where manures are used includes fields which may have received only a very small amount of manure (see section D2). On those fields receiving large dressings, there may be a greater adjustment in mineral fertiliser,
- where reductions in phosphate and potash fertiliser have not been made, this may indicate a desire to build up soil reserves of these nutrients.



The proportion of the sown area, of all crops, receiving each of the main types of manure is shown in Table D2.1a, with cattle FYM and cattle slurry being the most extensively applied manures.

Table D2.1a Percentage (%) of sown area receiving each organic manure type, Great Britain 2009 - 2013

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer hen manure*	*broiler/ turkey litter*	*other FYM*	*other*
2009	16	8	0	0	1	1	1	2
2010	16	9	1	0	1	1	1	2
2011	15	8	0	0	1	1	1	2
2012	15	10	1	1	1	1	1	2
2013	16	9	1	1	1	1	1	2

Note: some areas may receive more than one type of manure

Table D2.1b Percentage (%) distribution of each organic manure type on manured sown area, Great Britain 2009 – 2013

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer hen manure*	*broiler/ turkey litter*	*other FYM*	*other*
2009	59	30	2	1	2	3	2	8
2010	58	32	3	1	2	3	2	7
2011	56	30	2	1	2	3	3	9
2012	51	34	2	2	3	3	4	9
2013	56	31	2	2	3	3	4	6

Note: some areas may receive more than one type of manure

The percentage of the sown area receiving an application of cattle FYM in 2013 was 16%, which is consistent over the five year period. Cattle FYM and cattle slurry were applied to 87% of the sown area receiving organic manure.

The levels of nutrient in organic manures vary according to which type of manure is being applied as well as factors such as the size, age, gender, and market for the animals being farmed. Furthermore, the concentration of nutrients is dependent on the proportion of bedding, the length of time that the manure has been stored and, in the case of slurries particularly, diluting factors such rainwater or dirty water which affect the proportion of dry matter. The British Survey of Fertiliser Practice does not ask detailed questions on the animals producing manures or the nutrient analysis of any organic applications made, but it is possible to use typical values for different manure types to estimate the likely nutrient levels delivered. Details of these values are given in Table D2.2.

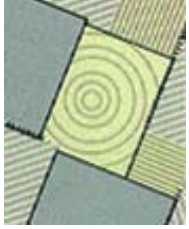


Table D2.2 Typical dry matter and nutrient content of different organic manure types[12]

	dry matter (%)	*total N (kg/t; kg/m^3)*	*total P_2O_5 (kg/t; kg/m^3)*	*total K_2O (kg/t; kg/m^3)*
Cattle FYM	25	6.0	3.2	8.0
Pig FYM	25	7.0	6.0	8.0
Sheep FYM	25	7.0	3.2	8.0
Duck manure	25	6.5	5.5	7.5
Layer hen manure	35	19.0	14.0	9.5
Broiler/turkey litter	60	30.0	25.0	18.0
Cattle slurry	6	2.6	1.2	3.2
Pig slurry	4	3.6	1.8	2.4
Digested liquid sewage sludge	4	2.0	3.0	0.1
Digested cake	25	11.0	18.0	0.6
Thermally dried	95	40.0	70.0	2.0
Lime stabilised	40	8.5	26.0	0.8
Composted	60	11.0	6.0	3.0
Compost-green	60	7.5	3.0	5.5
Compost-green/food	60	11.0	3.8	8.0

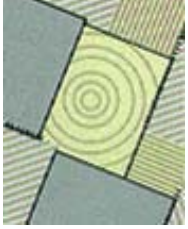
In Table D2.3, crops receiving manure applications have been classified as either “winter sown”, “spring sown” or “grass” and their average treated areas and manure application rates shown.

Table D2.3a Treated areas and average manure field application rates to winter sown and spring sown crops and grassland by manure type, Great Britain 2013

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other farm manure*	*bio-solids*	*other non-farm*
Winter sown										
Treated area %	7.2	0.8	0.9	1.8	2.0	1.7	0.7	-	2.9	0.9
Treated area (ha)	175,001	20,278	22,123	43,851	48,108	42,559	16,946	-	71,816	22,990
Avg manure rate (t; m^3/ha)	24	33	23	28	9	8	16	-	21	16
Volume (Mt; Mm^3)	4.2	0.7	0.5	1.2	0.4	0.3	0.3	-	1.5	0.4
Fields in sample	227	22	12	20	32	30	16	1	45	21
Spring sown										
Treated area %	19.3	3.5	2.0	0.7	1.9	1.7	1.0	-	1.9	1.1
Treated area (ha)	385,589	69,779	40,705	14,980	38,094	34,328	19,798	-	38,276	22,611
Avg manure rate (t; m^3/ha)	24	30	20	31	8	7	18	-	20	22
Volume (Mt; Mm^3)	9.2	2.1	0.8	0.5	0.3	0.3	0.4	-	0.8	0.5
Fields in sample	504	90	28	11	36	37	16	2	32	29
Grass										
Treated area %	24.0	24.4	-	0.2	0.3	0.1	1.5	0.7	0.2	0.1
Treated area (ha)	1,344,933	1,367,815	-	12,801	18,898	4,111	84,325	37,355	13,989	8,200
Avg manure rate (t; m^3/ha)	15	27	-	23	6	4	10	31	21	17
Volume (Mt; Mm^3)	20.6	37.0	-	0.3	0.1	0.0	0.8	1.2	0.3	0.1
Fields in sample	731	566	4	10	13	9	47	17	7	7

Note: This table excludes crops that cannot be classified as either winter or spring sown, such as permanent crops.

[12] Anon. (2010). *Fertiliser Manual (RB209),* Defra, 8th edition. The Stationery Office, London.



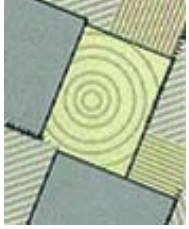
The majority of cattle manure and slurry applications were made to grassland, reflecting the practice of utilising the manure within the farm on which it is produced. Conversely, non-farm manures such as biosolids appear to be favoured on winter sown tillage land. The profile of the % treated area and average manure rates are broadly similar to those reported for 2012.

Table D2.3b Cattle FYM treated areas and average manure field application rates to winter sown and spring sown crops and grassland by farm type, Great Britain 2013

Cattle FYM	*Cereals*	*Dairy*	*General cropping*	*Mixed*	*Other livestock*	*All farm types*
Winter sown						
Treated area %	23.0	14.5	12.1	34.1	14.0	100.0
Treated area (ha)	40,267	25,399	21,089	59,615	24,456	175,001
Avg manure rate (t; m^3/ha)	20	22	34	24	24	24
Volume (Mt; Mm^3)	0.8	0.5	0.7	1.4	0.6	4.2
Fields in sample	34	44	27	79	40	227
Spring sown						
Treated area %	16.7	26.2	15.1	22.5	19.5	100.0
Treated area (ha)	64,303	100,989	58,133	86,807	75,357	385,589
Avg manure rate (t; m^3/ha)	21	25	27	24	23	24
Volume (Mt; Mm^3)	1.4	2.5	1.6	2.1	1.7	9.2
Fields in sample	56	143	66	111	128	504
Grass						
Treated area %	1.8	14.8	2.0	5.0	75.9	100.0
Treated area (ha)	24,367	199,619	26,334	67,622	1,020,607	1,344,933
Avg manure rate (t; m^3/ha)	22	19	19	18	14	15
Volume (Mt; Mm^3)	0.5	3.9	0.5	1.2	14.3	20.6
Fields in sample	15	111	19	51	533	731

Note: Only cattle FYM was applied in sufficient volume to warrant reporting by farm type. The treated area percentages may not add to 100% in “All farm types” as pig and poultry farms have been excluded.

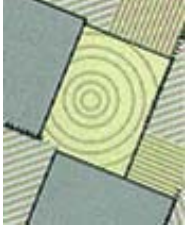
Table 2.3b shows a breakdown of the cattle FYM applications by robust farm type. Mixed farms have the most extensive treatments of cattle FYM on winter sown crops at 34.1% of the treated area. On grass 75.9% of the treated area (with cattle FYM) is on Other Livestock robust classification farms.



The time of year when manure was applied is shown in Table D2.4 as a proportion of fields receiving manure applications. Once again the crops have been classified as either “winter sown”, “spring sown” or “grass”. This segmentation highlights the prevalence of applications in August and September for winter sown crops (prior to drilling), whereas spring sown and grass fields are predominantly treated between November and April. The percentage of pig slurry applied as a top-dressing to winter-sown crops in the spring is of note, with the 2013 figure of 43% being the highest proportion recorded to date in the Survey.

Table D2.4 Percentage (%) of each organic manure type applied, by sowing season and timing, Great Britain 2013

	cattle FYM	*cattle slurry*	*pig FYM*	*pig slurry*	*layer manure*	*broiler/ turkey litter*	*other FYM*	*other farm manure*	*bio-solids*	*other non-farm*
Winter sown										
August	1	0	0	6	18	14	0	0	15	10
September	4	0	20	10	24	27	8	1	29	22
October	3	0	7	0	2	9	2	0	6	0
Winter (Nov, Dec, Jan)	0	0	1	0	0	0	1	0	1	4
Spring (Feb, Mar, Apr)	0	1	5	43	2	2	3	0	5	5
Summer (May, Jun, Jul)	0	0	0	2	0	1	0	0	0	1
Spring sown										
August	0	0	0	1	3	0	0	0	2	2
September	1	0	6	0	15	2	3	0	1	3
October	1	0	4	5	0	12	6	0	3	1
Winter (Nov, Dec, Jan)	2	0	15	1	0	2	0	0	2	4
Spring (Feb, Mar, Apr)	14	4	35	14	13	25	7	1	22	32
Summer (May, Jun, Jul)	1	0	0	0	5	2	0	0	2	0
Grass										
August	3	3	0	0	0	0	6	9	0	0
September	4	3	0	0	0	0	7	0	0	0
October	5	2	0	0	0	0	11	0	0	0
Winter (Nov, Dec, Jan)	8	10	0	0	0	0	2	27	1	0
Spring (Feb, Mar, Apr)	40	49	5	10	16	4	32	46	7	13
Summer (May, Jun, Jul)	10	26	0	8	2	1	12	16	3	2



D3 FERTILISER VALUE OF ORGANIC MANURES

Organic manures are valuable sources of the major plant nutrients (nitrogen, phosphorus and potassium) and, where used, applications of manufactured fertiliser can usually be reduced[13]. In the survey, farmers were not asked directly whether they had made an adjustment to fertiliser inputs because of manure use, however an indication of possible adjustments has been derived by comparing fields that received manure with those that did not. Organic fields, which use no mineral fertilisers, have been excluded from these comparisons, since they would distort the influence of manures on mineral application rates. Table D3.1a shows the dressing cover, average field rate and overall fertiliser rates for the main tillage crops in Great Britain, with and without manure inputs.

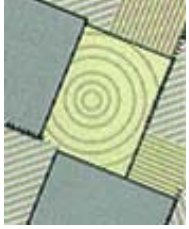
Table D3.1a Dressing cover (%) and application rates (kg/ha) of manufactured fertiliser to tillage crops in Great Britain, with and without applications of organic manure, 2013

	nitrogen		*phosphate*		*potash*		*fields in sample*	
dressing cover (%)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	100	100	28	46	32	46	217	975
Spring barley	97	100	64	63	66	70	252	606
Winter barley	100	99	43	51	50	59	77	290
Potatoes (maincrop)	100	96	79	91	83	96	37	48
Sugar beet	100	97	24	58	64	71	56	60
Winter oilseed rape	99	98	25	48	20	44	80	384

	nitrogen		*phosphate*		*potash*		*fields in sample*	
average field rate (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	175	188	56	63	71	74	217	975
Spring barley	99	114	44	51	60	69	252	606
Winter barley	141	146	60	54	73	73	77	290
Potatoes (maincrop)	183	174	150	139	246	260	37	48
Sugar beet	87	106	63	59	113	107	56	60
Winter oilseed rape	163	191	84	57	73	69	80	384

	nitrogen		*phosphate*		*potash*		*fields in sample*	
overall application rate (kg/ha)	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	175	187	16	29	22	34	217	975
Spring barley	96	113	28	32	40	48	252	606
Winter barley	141	145	26	28	36	43	77	290
Potatoes (maincrop)	183	167	119	126	203	249	37	48
Sugar beet	87	103	15	34	72	76	56	60
Winter oilseed rape	161	187	21	28	15	30	80	384

[13] Anon. (2010). *Fertiliser Manual (RB209),* Defra, 8th edition. The Stationery Office, London. ISBN 978-0-11-243286-9. For the latest release see the Defra web site



For all the major tillage crops, except potatoes, the overall rate of nitrogen from manufactured mineral fertiliser is higher on fields where organic manures were not applied. Application rate increases of nitrogen ranged from 4 kg/ha for winter barley to 26 kg/ha on winter oilseed rape, although the fact that the data derive from fewer fields should be taken into account. This is also predominantly the case for phosphate and potash fertiliser application rates. This is most dramatically illustrated by a 56% decrease in the application rate of phosphate on manured sugar beet fields. This decrease was mainly caused by a reduction in dressing cover with only 24% of manured sugar beet fields receiving a dressing of phosphate fertiliser. The survey does not collect reasons why manufactured fertiliser application rates may vary when used with or without organic manures. It is possible that certain fields are being managed to achieve a desired nutrient status and a strategy of this sort may require unusually high or low applications of specific nutrients. Where only a small number of fields are surveyed, such a strategy may exert an influential bias on the overall figures for a crop.

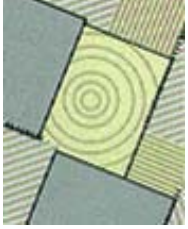
Table D3.1b Overall application rates (kg/ha) of manufactured fertiliser application to tillage crops in Great Britain, with and without applications of organic manure, 2009 - 2013

nitrogen (kg/ha)	*2009*		*2010*		*2011*		*2012*		*2013*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	180	192	187	197	179	198	170	190	175	187
Spring barley	89	107	91	108	97	107	95	105	96	113
Winter barley	138	142	138	146	137	144	140	145	141	145
Potatoes (maincrop)	155	185	139	138	146	178	133	136	183	167
Sugar beet	88	101	87	96	81	99	89	99	87	103
Winter oilseed rape	176	191	175	204	174	203	166	191	161	187

phosphate (kg/ha)	*2009*		*2010*		*2011*		*2012*		*2013*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	9	18	16	29	15	32	13	29	16	29
Spring barley	34	29	35	36	37	35	32	36	28	32
Winter barley	20	23	26	35	24	32	18	33	26	28
Potatoes (maincrop)	108	164	99	135	122	119	108	104	119	126
Sugar beet	13	24	11	38	10	36	13	31	15	34
Winter oilseed rape	5	23	10	33	10	30	8	28	21	28

potash (kg/ha)	*2009*		*2010*		*2011*		*2012*		*2013*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Winter wheat	21	23	26	32	30	34	21	33	22	34
Spring barley	39	43	45	50	47	47	42	51	40	48
Winter barley	29	35	36	50	34	49	27	44	36	43
Potatoes (maincrop)	176	291	163	230	199	213	183	208	203	249
Sugar beet	64	80	88	73	50	93	65	73	72	76
Winter oilseed rape	12	26	17	32	15	29	11	30	15	30

Differences in overall application rates with and without manures for nitrogen, phosphate and potash for the period 2009 to 2013 are shown in table D3.1b above. The trend for higher nitrogen rates on unmanured fields holds true for nitrogen for all major tillage crops throughout the period, with the exception being potatoes in 2010 and 2013. The increased rates are most consistent for nitrogen on winter oilseed rape at between 8% and 14% increase over manured fields. Overall rates for phosphate and potash in winter wheat show a similar trend over the five year period. Other crops show greater variability between manured and unmanured field rates for the different nutrients which may in part be due to the lower number of fields of each of these crops in the survey causing higher statistical variability.



Data for grassland are presented separately because grass is managed differently according to the amount of production required. Thus, intensive milk production requires large volumes of grass and is likely to receive higher inputs of both manure and mineral fertilisers than beef or sheep systems. Table D3.2 shows the average field rate of fertiliser applied to grassland in different management systems (as defined by robust farm type groups) with and without applications of manure. Average field rates have been used for grassland because grass fields often receive no mineral fertiliser, not because of manure use, but because the amount of grass production required does not warrant fertiliser input.

Table D3.2 Average field rates (kg/ha) of manufactured fertiliser application on grassland with and without applications of organic manure by robust type group, Great Britain 2013

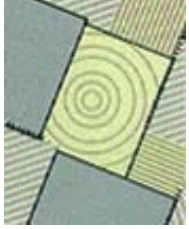
	nitrogen (kg/ha)		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
Cereals								
Grass under 5 years old *	121	116	28	30	38	53	20	93
Grass 5 years and over *	64	85	24	27	35	33	13	240
All grass	96	95	25	28	36	41	33	333
Dairy								
Grass under 5 years old	170	145	29	32	60	36	144	69
Grass 5 years and over	138	120	23	23	34	32	257	141
All grass	147	125	25	26	42	33	401	210
General cropping								
Grass under 5 years old *	106	106	22	33	33	43	15	65
Grass 5 years and over *	99	92	18	22	36	28	25	137
All grass	101	96	19	26	35	34	40	202
Mixed								
Grass under 5 years old *	144	116	30	32	66	42	36	127
Grass 5 years and over *	71	80	19	23	24	26	32	222
All grass	96	90	23	26	41	31	68	349
Other livestock								
Grass under 5 years old	95	87	26	26	40	32	176	171
Grass 5 years and over	85	65	19	18	25	19	474	651
All grass	87	68	21	19	28	20	650	822
All farm types								
Grass under 5 years old	137	109	27	29	50	39	392	525
Grass 5 years and over	103	77	21	19	28	22	805	1,394
All grass	111	84	22	22	33	26	1,197	1,919

Note: The values in “All farm types” exceed the sum of the components in the table as it also includes pig and poultry farms

* Note: small number of fields receiving manures (typically less than 36 fields).

When looking at all farm types taken together, the rates of nitrogen, phosphate and potash fertiliser were usually higher on fields where manures were also used. Mineral fertiliser rates were also consistently higher on short term grass than permanent grassland. The data for certain robust groups, notably cereals, general cropping and mixed farms are derived from relatively few fields so need to be treated with due caution. Nitrogen rates were significantly higher on dairy farms but more comparable on other farm types except “other” livestock farms where rates were lower. This indicates that dairy famers are intensive grass growers looking for high yields. For phosphate and potash rates were comparable across all farm types except “other livestock” farms where rates were lower also.

As so many fields on dairy farms receive manure, a separate analysis was carried out to examine the influence of grass management (Table D3.3a).



All grazing land also receives manure, it is just that it is not applied as a dressing in our context.

Table D3.3a Average field rates (kg/ha) of manufactured fertiliser application on dairy grassland with and without applications of organic manure, Great Britain 2013

	nitrogen (kg/ha)		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
All cut for hay	103	124	15	19	27	21	20	18
All cut for silage	161	146	28	30	50	47	260	71
All grazings	141	124	24	24	40	32	313	195

Application rates of mineral fertilisers are consistently higher for grass to be cut for silage. No clear pattern has emerged when comparing rates with and without manure, indicating that rates are more likely to be influenced by the grass production requirements.

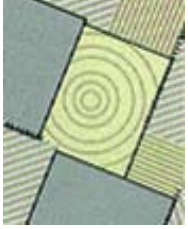
Table D3.3b Average field rates (kg/ha) of manufactured fertiliser application on dairy grassland with and without applications of organic manure, Great Britain 2009 – 2013

all cut for hay	*nitrogen (kg/ha)*		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
2009	129	77	22	17	41	19	29	15
2010	70	99	25	22	29	43	25	15
2011	70	112	24	14	33	26	13	16
2012	122	83	28	23	42	36	16	17
2013	103	124	15	19	27	21	20	18

all cut for silage	*nitrogen (kg/ha)*		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
2009	154	127	29	32	48	44	280	66
2010	163	144	27	35	50	53	277	77
2011	158	117	28	30	48	46	293	65
2012	145	151	28	30	47	57	266	70
2013	161	146	28	30	50	47	260	71

all grazings	*nitrogen (kg/ha)*		*phosphate (kg/ha)*		*potash (kg/ha)*		*fields in sample*	
	with manure	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*	*with manure*	*without manure*
2009	146	115	28	22	42	27	375	194
2010	155	125	25	23	39	28	359	226
2011	143	111	27	21	40	27	363	209
2012	138	113	24	21	38	30	320	190
2013	141	124	24	24	40	32	313	195

Mineral fertiliser application rates of nitrogen are variable over the 5 year period 2009-13 irrespective of the grass management system. Data for grass cut for hay should be treated with caution as the number of fields managed this way is low. Average field rates of phosphate are more stable, particularly on manured fields, in the range of 27-29 kg/ha for fields cut for silage and 24-28 kg/ha on all grazed fields. Potash average field rates for manured silage and grazed grass were in the range 47-50 kg/ha and 39-42 kg/ha respectively.



SECTION E

E1 SPREADING PRECISION AND RECORD KEEPING

Farmers were asked a series of questions about the care taken in application of fertilisers and manures and in record keeping. The results are presented in this section.

In 2013, 39% of farmers, who were using a spreader, indicated they check the accuracy of mineral fertiliser spreaders by using catch trays on an annual basis (Table E1.1). Farmers checking more frequently than this total 4%, checking at each change of fertiliser. Twenty six percent of farmers never check their spreaders for accuracy.

Table E1.1 Frequency of spread pattern checks using catch trays, percentage (%) of those farms with a spreader, Great Britain 2009-2013

	No spreader	*It is factory set & doesn't need checking*	*At each change of fertiliser type*	*Less than once a year*	*Once a year*	*Never checked*	*Contract applied*	*Other*
2009	6	8	5	11	38	25	11	3
2010	9	8	6	10	40	27	9	0
2011	8	6	4	11	39	26	11	2
2012	8	7	6	8	37	27	13	3
2013	10	8	4	11	39	26	11	2

Practices of checking are generally consistent over the five year period 2009-2013, with contractors used on 11% of farms on average over this time.

Table E1.2a Record keeping methods for fertiliser and manure applications on farms where each respective nutrient type was applied during the 2012/13 crop year, Great Britain 2013

	manufactured fertilisers		*organic manures*	
	farms	*farms %*	*farms*	*farms %*
Computer program	15,193	21.2	7,791	18.0
Farm diary	35,337	49.2	22,412	51.9
Farm notebook/pocketbook	16,924	23.6	9,518	22.0
File record sheet (file in the office)	14,233	19.8	8,158	18.9
Other paper record	1,998	2.8	1,127	2.6
No records kept	4,374	5.7	4,735	9.9

Note: more than one method may be used

Farm diaries continue to be the most common method for recording both fertiliser and manure use (Table E1.2a). Computers were used for recording fertiliser applications on 21% of farms, whereas no records were kept on 6% of farms. Computerised record keeping is slightly less common for organic manures at 18% of farms.

Table E1.4b shows the approach to record keeping on different types of farms. For manufactured fertilisers use of computers is highest on cereal farms at 37%, and lowest, at less than 10% on dairy and other livestock farms, where a higher proportion use farm diaries. Farms of all types favour diaries for recording applications of organic manures. The method of record keeping for all the different farm types is broadly similar for both manufactured and organic fertilisers.

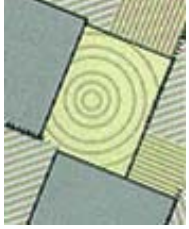


Table E1.2b Record keeping methods for fertiliser and manure applications on farms where each nutrient type was applied during the 2011/12 crop year, by farm type, Great Britain 2013

	manufactured fertilisers		*organic manures*	
Cereals	*farms*	*farms %*	*farms*	*farms %*
Computer program	6,367	37.1	1,932	34.3
Farm diary	6,323	36.8	1,798	31.9
Farm notebook/pocketbook	3,239	18.9	1,027	18.2
File record sheet (file in the office)	4,766	27.8	1,411	25.0
Other paper record	663	3.9	397	7.0
No records kept	128	0.7	104	1.8
	manufactured fertilisers		*organic manures*	
Dairy	*farms*	*farms %*	*farms*	*farms %*
Computer program	965	9.3	971	11.4
Farm diary	6,281	60.8	5,294	62.1
Farm notebook/pocketbook	2,258	21.9	1,830	21.4
File record sheet (file in the office)	1,858	18.0	1,521	17.8
Other paper record	198	1.9	0	0.0
No records kept	210	2.0	420	4.8
	manufactured fertilisers		*organic manures*	
General cropping	*farms*	*farms %*	*farms*	*farms %*
Computer program	3,489	33.1	1,388	34.2
Farm diary	4,516	42.8	1,567	38.7
Farm notebook/pocketbook	2,032	19.3	633	15.6
File record sheet (file in the office)	2,830	26.8	1,316	32.5
Other paper record	14	0.1	0	0.0
No records kept	110	1.0	221	5.2
	manufactured fertilisers		*organic manures*	
Mixed	*farms*	*farms %*	*farms*	*farms %*
Computer program	2,281	27.8	1,606	27.5
Farm diary	3,900	47.6	2,648	45.4
Farm notebook/pocketbook	1,590	19.4	1,583	27.1
File record sheet (file in the office)	1,829	22.3	1,071	18.4
Other paper record	167	2.0	111	1.9
No records kept	123	1.5	111	1.9
	manufactured fertilisers		*organic manures*	
Other livestock	*farms*	*farms %*	*farms*	*farms %*
Computer program	1,687	6.8	1,668	8.8
Farm diary	13,998	56.5	11,104	58.8
Farm notebook/pocketbook	7,757	31.3	4,398	23.3
File record sheet (file in the office)	2,926	11.8	2,815	14.9
Other paper record	956	3.9	618	3.3
No records kept	3,804	13.3	3,879	17.0
	manufactured fertilisers		*organic manures*	
All farm types	*farms*	*farms %*	*farms*	*farms %*
Computer program	15,193	21.2	7,791	18.0
Farm diary	35,337	49.2	22,412	51.9
Farm notebook/pocketbook	16,924	23.6	9,518	22.0
File record sheet (file in the office)	14,233	19.8	8,158	18.9
Other paper record	1,998	2.8	1,127	2.6
No records kept	4,374	5.7	4,735	9.9

Note: more than one method may be used

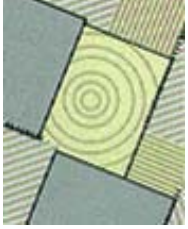
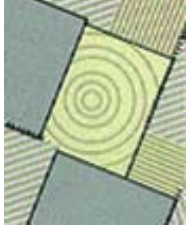


Table E1.2c Record keeping methods percentage (%) of farms, for fertiliser and manure applications on farms where each respective nutrient type was applied in the crop year, Great Britain 2009-2013

		computer program	*farm diary*	*farm notebook/ pocket-book*	*file record sheet (file in the office)*	*other paper record*	*no records kept*
manufactured fertilisers	2009	20.0	45.0	28.8	20.5	3.0	4.9
	2010	23.8	43.9	24.2	22.7	5.3	5.8
	2011	23.4	43.5	22.2	23.8	2.0	5.9
	2012	23.4	51.4	21.1	20.4	1.1	7.1
	2013	21.2	49.2	23.6	19.8	2.8	5.7
organic manures	2009	12.4	52.7	26.1	18.2	3.7	9.3
	2010	17.2	47.9	21.4	23.5	4.9	9.9
	2011	18.9	47.6	19.8	24.9	1.9	8.5
	2012	20.0	53.1	20.4	20.4	1.7	12.6
	2013	18.0	51.9	22.0	18.9	2.6	9.9

Note: more than one method may be used

Recording methods for manufactured fertilisers show minor variations across the five year period 2009-13 with farm diaries remaining the most widely used recording method. For organic manures, records of some type were kept on 87-92% of farms for the five year period. The data show organic manure treatments have been increasingly recorded using computer programs over this five year period.



APPENDIX 1 - SURVEY STATISTICS

APP 1.1 SAMPLING VARIATION

Table App 1.1 Standard errors of application rates for the major crops in 2013

Great Britain

	standard errors for overall application rates (kg/ha)						standard error for average field rates (kg/ha)						fields in sample
	total N	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	*total N*	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	
winter wheat	2.3	2.7	1.4	1.4	1.8	1.4	2.0	2.1	5.9	1.8	2.1	1.6	1212
oilseed rape	2.8	2.9	1.2	1.7	2.0	2.5	2.7	2.8	4.3	2.0	2.6	2.5	552
winter barley	2.5	3.1	2.0	1.8	2.4	2.1	2.4	2.5	5.7	1.9	2.4	3.3	375
spring barley	1.7	2.2	1.6	1.2	1.6	1.2	1.6	1.9	1.9	1.3	1.7	2.2	879
m/c potatoes	8.5	8.0	9.8	9.8	14.4	3.9	7.7	9.5	9.3	9.3	11.9	11.6	87
sugar beet	3.5	3.7	2.1	3.9	6.9	8.7	3.3	3.1	8.7	5.4	6.4	18.2	117
all tillage crops	1.9	2.3	1.1	0.9	1.3	1.0	1.7	1.9	1.9	1.3	1.8	1.7	4274
all grass	1.8	1.6	1.2	0.4	0.5	0.3	1.9	2.5	1.7	0.7	1.0	2.2	3378

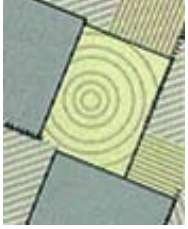
England & Wales

	standard errors for overall application rates (kg/ha)						standard error for average field rates (kg/ha)						fields in sample
	total N	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	*total N*	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	
winter wheat	2.5	2.7	1.2	1.4	1.8	1.4	2.2	2.3	6.2	2.1	2.3	1.5	1121
oilseed rape	3.0	3.1	1.2	1.7	2.1	2.6	2.8	2.9	4.6	2.2	2.9	2.6	521
winter barley	2.7	3.4	2.1	1.9	2.5	2.1	2.5	2.7	6.4	2.1	2.7	3.2	327
spring barley	2.0	2.5	1.6	1.3	1.9	1.4	1.9	2.0	2.6	1.9	2.3	2.5	625
m/c potatoes	9.0	8.7	9.9	9.9	15.2	4.1	8.1	10.2	9.4	9.4	12.6	12.1	78
sugar beet	3.5	3.7	2.1	3.9	6.9	8.7	3.3	3.1	8.7	5.4	6.4	18.2	117
all tillage crops	2.2	2.5	1.1	1.0	1.4	1.1	2.0	2.0	2.4	1.5	2.2	1.8	3712
all grass	2.0	1.8	1.2	0.4	0.6	0.4	2.2	2.6	2.0	0.8	1.2	2.6	2678

Scotland

	standard errors for overall application rates (kg/ha)						standard error for average field rates (kg/ha)						fields in sample
	total N	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	*total N*	*strt N*	*comp N*	*total P_2O_5*	*total K_2O*	*total SO_3*	
winter wheat	6.1	9.6	8.2	4.5	6.1	6.5	6.1	6.4	14.6	3.6	5.4	8.9	91
oilseed rape	7.3	8.2	7.7	5.9	6.5	11.0	7.3	8.2	11.4	4.0	4.9	10.3	31
winter barley	6.6	7.4	6.5	5.3	6.6	8.4	6.6	6.7	13.0	3.9	4.7	12.1	48
spring barley	2.9	3.9	3.1	1.9	2.6	2.3	2.8	3.9	2.8	1.6	2.3	4.4	254
all potatoes	19.6	11.9	21.2	22.2	29.4	8.3	17.7	21.9	19.3	20.4	24.6	13.5	16
all tillage crops	3.3	4.4	3.0	1.9	2.5	2.2	3.2	4.4	2.6	1.7	2.4	4.5	562
all grass	4.0	3.5	3.1	1.1	1.5	0.5	3.7	6.8	3.2	1.2	1.9	3.3	700

The standard errors quoted in Table App 1.1 are a measure of the standard deviation of the mean, and are used to judge the accuracy of the results for each cell in the table. This is a standard statistical process where the standard deviation of each cell is calculated first and then divided by the square root of the number of data points within that cell. Approximate 95% confidence limits will be the quoted value +/- 2 standard errors.



APP 1.2 RESPONSE RATE

Tables App 1.2 and App 1.3 summarise information regarding the response received to the main and reserve samples.

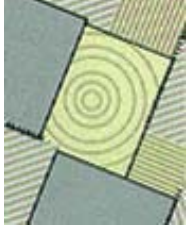
Table App 1.2 Response to main and reserve samples in 2013

	2013	*% total*
Target sample	1500	100
2012 panellists agreeing to re-contact in 2013	1329	89
Achieved 'Main' sample from 2012 panel	1040	69
Achieved additional 'Main' sample	135	9
Achieved '1st reserve' sample	93	6
Achieved '2nd reserve' sample	55	4
Achieved '3rd reserve' sample	37	2
Total achieved	**1360**	**91**
Total number of refusals/non-contact	1298	
Total number of farms approached	***2658***	

Table App 1.3 Response to main and reserve samples for 2009 - 2013

Net response rate	*2009 %*	*2010 %*	*2011 %*	*2012 %*	*2013 %*
Overall achieved rate	92	91	95	94	91
Achieved % of total contact attempts	53	48	59	53	51
Main sample	81	83	81	82	78
Reserve sample(s)	19	17	19	18	12
Main reason for refusal	*2009 %*	*2010 %*	*2011 %*	*2012 %*	*2013 %*
Too busy	18	15	20	22	25
Not interested	14	10	13	13	16
Do not do surveys	3	3	4	4	5
Want payment	0	0	0	0	1
Too much paperwork	1	0	1	0	1
Non contact	36	55	40	41	32
Other [a]	27	16	22	20	20

[a] includes late submission, contributed enough and incorrect telephone number
Farms in the >200ha size band are oversampled by 25%, which has the effect of increasing response rates.

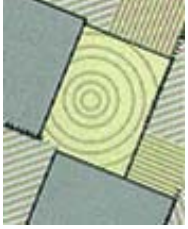


APP 1.3 INFORMATION ON HOLDINGS BELOW 20 HECTARES

Holdings of less than 20 hectares in size are excluded from the BSFP sample. These smaller farms account for a significant proportion of the number of holdings but a much smaller proportion of the area of crops and grass. At Great Britain level, the total number of holdings in the population for 2012 was 197,706. Holdings below 20 hectares accounted for 4% of the total crop area and 10% of the total grass area; this was unchanged from the previous year. Further detailed information for Great Britain is provided in the table below on the equivalent crop or grassland areas and number of holdings for those holdings where the total size of the farm is below 20 hectares.

2012	Total area (ha)	Total no. holdings area>0	Area (ha) <20ha	No. of holdings with <20ha	Proportion of area <20ha	Proportion of holdings <20ha	No. of holdings with zero area	Total no. holdings
Total croppable area	6,069,508	91,262	245,594	40,558	4%	44%	106,444	197,706
of which crops	4,846,757	66,518	191,702	27,630	4%	42%	131,188	197,706
of which temporary grass< 5 years old	1,222,752	57,534	255,531	39,138	21%	68%	140,172	197,706
Total grass	6,376,005	161,390	613,697	85,919	10%	53%	36,616	197,706
grass < 5 years old	1,222,752	57,534	255,531	39,138	21%	68%	140,172	197,706
grass ≥ 5 years old	5,153,253	153,133	618,808	87,668	12%	57%	44,573	197,706

Note: Includes bare fallow and uncropped land.

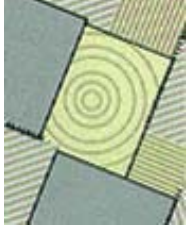


APPENDIX 2

APP 2.1 ENGLISH COUNTIES WITHIN BSFP AND DEFRA REGIONS

List of English counties indicating the BSFP and Government Office Regions within which they fall.

	County	BSFP REGION	GOR
1	Bedfordshire	Anglia	Eastern
2	Berkshire	South-East	South East
3	Buckinghamshire	South-East	South East
4	Cleveland	North-East	North East
5	Cambridgeshire	Anglia	Eastern
6	Cheshire	North Mercia	North West
7	Cornwall	South-West	South West
8	Cumbria	Northern	North West
9	Derbyshire	East Midlands	East Midlands
10	Devon	South-West	South West
11	Dorset	Wessex	South West
12	Durham	North-East	North East
13	Essex	Anglia	Eastern
14	Gloucestershire	South Mercia	South West
15	Hampshire	South-East	South East
16	Isle of Wight	South-East	South East
17	Hereford & Worcester	South Mercia	West Midlands
18	Hertfordshire	Anglia	Eastern
20	Kent	South-East	South East
21	Lancashire	Northern	North West
22	Leicestershire	East Midlands	East Midlands
24	Lincolnshire	Eastern	East Midlands
25	Merseyside	North Mercia	North West
26/27	Greater London(E)	South-East	London
28	Norfolk	Anglia	Eastern
29	Northamptonshire	East Midlands	East Midlands
30	Tyne and Wear	Northern	North East
31	Northumberland	Northern	North East
32	Nottinghamshire	East Midlands	East Midlands
33	Oxfordshire	South-East	South East
34	N Somerset and S Gloucestershire	Wessex	South West
35	Shropshire	North Mercia	West Midlands
36	Somerset	Wessex	South West
37	Staffordshire	North Mercia	West Midlands
38	Suffolk	Anglia	Eastern
39	Isles of Scilly		
40	Surrey	South-East	South East
41	East Sussex	South-East	South East
42	West Sussex	South-East	South East
43	Warwickshire	South Mercia	West Midlands
44	Greater Manchester	North Mercia	North West
45	Wiltshire	Wessex	South West
46	West Midlands	South Mercia	West Midlands
47	South Yorkshire	North-East	Yorkshire and the Humber
48	North Yorkshire (Northallerton)	North-East	Yorkshire and the Humber
49	West Yorkshire	North-East	Yorkshire and the Humber
50	North Yorkshire (Beverley)	North-East	Yorkshire and the Humber
51	East Riding of Yorks and North Lincs	North-East	Yorkshire and the Humber



APPENDIX 3

APP 3.1 UK FARM CLASSIFICATION SYSTEM

UK farm classification system (Revised 2004): composition of robust, main and other types by constituent EC type.

Robust types	Main types	Constituent EC types [a]
1 Cereals	1 Cereals	[1312]
2 General Cropping	2 General Cropping	[1412], 142, 143, [1443], 602, 603, 604, [6052]
3 Horticulture	3 Specialist fruit	3211
	4 Specialist glass	2012, 2022, 2032
	5 Specialist Hardy Nursery Stock	[3401]
	6 Other horticulture	2011, 2013, 2021, 2023, 2031,2033, 2034, 311, 312, 313, 314, [3402], 601, 6061, 6062
4 Specialist Pigs	7 Specialist pigs	5011, 5012, 5013
5 Specialist Poultry	8 Specialist poultry	5021, 5022, 5023
6 Dairy	9 Dairy (LFA)	411, 412 (LFA)
	10 Dairy (lowland)	411, 412 (non-LFA)
7 LFA Grazing Livestock	11 Specialist sheep (SDA)	441 (SDA)
	12 Specialist beef (SDA)	421,422 (SDA)
	13 Mixed Grazing Livestock(SDA)	431, 432, 442, 443, [4443], [4444] (SDA)
	14 Various Grazing Livestock (DA)	421, 422, 431, 432, 441, 442, 443, [4443], [4444] (DA)
8 Lowland Grazing Livestock [b]	15 Various Grazing Livestock (lowland)	421, 422, 431, 432, 441, 442, 443, [4443], [4444] (non-LFA)
9 Mixed	16 Cropping and dairy	811, 812
	17 Cropping, cattle and sheep	[8132], [8142]
	18 Cropping, pigs and poultry	821
	19 Cropping and mixed livestock	822, 8232
	20 Mixed livestock	5031, 5032, 711, [7122], 721, 722, 723
10 Other [c]	21 Specialist set-aside	[1311]
	22 Specialist grass and forage	[1411], [1444], [4442], [6051], [7121], [8131], [8141]
	23 Specialist horses	[4441]
	24 Non-classifiable holdings: fallow	[91]
	25 Non-classifiable holdings: other	[92]

[a] 2004 EC Typology described in Commission Decision 85/377/EEC as amended by Commission Decisions 94/376/EC, 96/393/EC and 99/725/EC with minor modifications to adapt it to United Kingdom conditions. For a full list of EC types see here. These minor modifications are indicated by the EC farm type number being shown in square brackets. Definitions for these modified EC farm types are available from the Defra contact shown at the front of this publication. EC types 132, 133, 1441, 1442, 3212, 3213, 322, 323, 330, and 8231 have not been allocated in the classification, since these types of production do not occur in the United Kingdom at a significant level.

[b] Definitions of LFA (Less Favoured Area), lowland, SDA (Severely Disadvantaged Area), and DA (Disadvantaged Area) farms are available on request from the Defra contact shown at the front of this publication.

[c] Not included in the British Survey of Fertiliser Practice.